
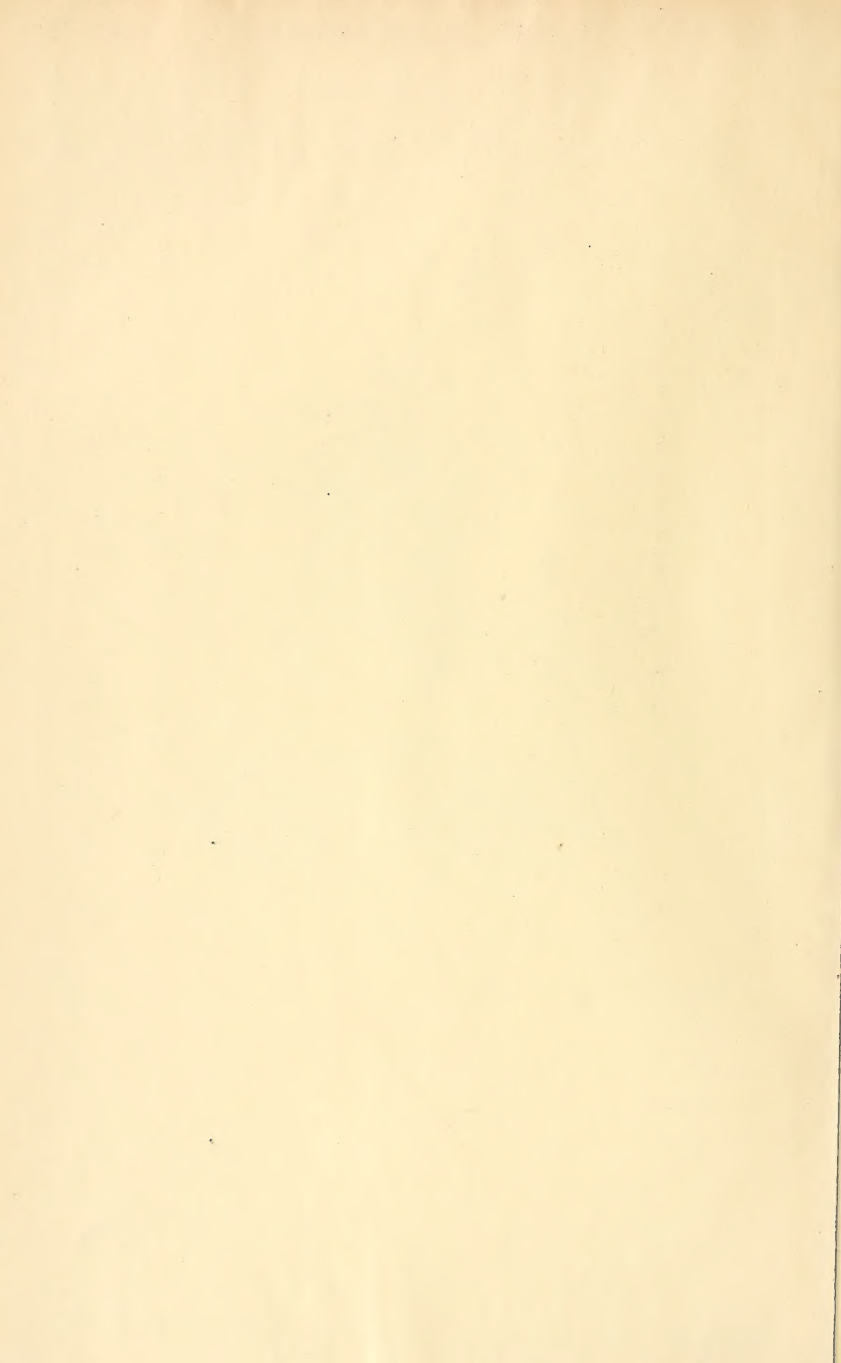


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THE
AMERICAN YEAR-BOOK
OF
MEDICINE AND SURGERY

BEING

A Yearly Digest of Scientific Progress and Authoritative Opinion
in all Branches of Medicine and Surgery, drawn from Jour-
nals, Monographs, and Text-Books, of the Leading
American and Foreign Authors and Investigators

COLLECTED AND ARRANGED

WITH CRITICAL EDITORIAL COMMENTS

BY

SAMUEL W. ABBOTT, M.D.,
JOHN J. ABEL, M.D.,
J. M. BALDY, M.D.,
CHARLES H. BURNETT, M.D.,
ARCHIBALD CHURCH, M.D.,
J. CHALMERS D'ACOSTA, M.D.,
W. A. NEWMAN DORLAND, M.D.,
LOUIS A. DUHRING, M.D.,
D. L. EDSALL, M.D.,
VIRGIL P. GIBNEY, M.D.,
HENRY A. GRIFFIN, M.D.,
JOHN GUITÉRAS, M.D.,
C. A. HAMANN, M.D.,
ALFRED HAND, JR., M.D.,

HOWARD F. HANSELL, M.D.,
MILTON B. HARTZELL, M.D.,
BARTON COOKE HIRST, M.D.,
E. FLETCHER INGALS, M.D.,
WYATT JOHNSTON, M.D.,
W. W. KEEN, M.D.,
HENRY G. OHLS, M.D.,
WENDELL REBER, M.D.,
DAVID RIESMAN, M.D.,
LOUIS STARR, M.D.,
ALFRED STENGEL, M.D.,
G. N. STEWART, M.D.,
J. R. TILLINGHAST, JR., M.D.,
J. HILTON WATERMAN, M.D.

UNDER THE GENERAL EDITORIAL CHARGE OF

GEORGE M. GOULD, M.D.

ILLUSTRATED

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LIST OF CONTRIBUTORS.

- SAMUEL W. ABBOTT, M. D.,** BOSTON, MASS.
Secretary of the Massachusetts State Board of Health.
- JOHN J. ABEL, M. D.,** BALTIMORE, MD.
Professor of Pharmacology, Johns Hopkins Medical School, Baltimore, Md.
- J. MONTGOMERY BALDY, M. D.,** PHILADELPHIA, PA.
Professor of Gynecology, Philadelphia Polyclinic; Surgeon to the Gynecean Hospital, Philadelphia.
- CHARLES H. BURNETT, M. D.,** PHILADELPHIA, PA.
Clinical Professor of Otology, Woman's Medical College; Emeritus Professor of Diseases of the Ear, Philadelphia Polyclinic.
- ARCHIBALD CHURCH, M. D.,** CHICAGO, ILL.
Professor of Mental Diseases and Medical Jurisprudence, Northwestern University Medical School, Chicago, Ill.
- J. CHALMERS DACOSTA, M. D.,** PHILADELPHIA, PA.
Clinical Professor of Surgery, Jefferson Medical College, Philadelphia; Surgeon to the Philadelphia Hospital.
- W. A. NEWMAN DORLAND, M. D.,** PHILADELPHIA, PA.
Assistant Demonstrator of Obstetrics, University of Pennsylvania; Consulting Obstetrician to the Southeastern Dispensary, Philadelphia.
- LOUIS A. DUHRING, M. D.,** PHILADELPHIA, PA.
Professor of Diseases of the Skin, University of Pennsylvania, Philadelphia.
- D. L. EDSALL, M. D.,** PHILADELPHIA, PA.
Associate in the Pepper Laboratory of Clinical Medicine; Physician to St. Christopher's Hospital for Children, Philadelphia.
- VIRGIL P. GIBNEY, M. D.,** NEW YORK CITY.
Clinical Professor of Orthopedic Surgery, College of Physicians and Surgeons, New York City.
- HENRY A. GRIFFIN, M. D.,** NEW YORK CITY.
Assistant Physician to the Roosevelt Hospital, Out-Patient Department, New York City.
- JOHN GUITÉRAS, M. D.,** PHILADELPHIA, PA.
Professor of General Pathology and Morbid Anatomy, University of Pennsylvania, Philadelphia.
- C. A. HAMANN, M. D.,** CLEVELAND, OHIO.
Professor of Anatomy, Western Reserve University, Cleveland, Ohio.

- ALFRED HAND, JR., M. D., PHILADELPHIA, PA.
Demonstrator of Pathologic Histology, University of Pennsylvania, Philadelphia.
- HOWARD F. HANSELL, M. D., PHILADELPHIA, PA.
Professor of Diseases of the Eye, Philadelphia Polyclinic; Clinical Professor of Ophthalmology, Jefferson Medical College, Philadelphia.
- M. B. HARTZELL, M. D., PHILADELPHIA, PA.
Instructor in Dermatology, University of Pennsylvania, Philadelphia.
- BARTON COOKE HIRST, M. D., PHILADELPHIA, PA.
Professor of Obstetrics, University of Pennsylvania, Philadelphia.
- E. FLETCHER INGALS, M. D., CHICAGO, ILL.
Professor of Laryngology and Diseases of the Chest, Rush Medical College, Chicago, Ill.
- WYATT JOHNSTON, M. D., MONTREAL, CAN.
Assistant Professor of Public Health and Lecturer on Medico-Legal Pathology, McGill University, Montreal, Canada.
- W. W. KEEN, M. D., PHILADELPHIA, PA.
Professor of the Principles of Surgery and of Clinical Surgery, Jefferson Medical College, Philadelphia.
- HENRY G. OHLS, M. D., CHICAGO, ILL.
- WENDELL REBER, M. D., PHILADELPHIA, PA.
Ophthalmic Surgeon to the Franklin Dispensary and to the Methodist Episcopal Orphanage, Philadelphia.
- DAVID RIESMAN, M. D., PHILADELPHIA, PA.
Adjunct Professor of Clinical Medicine and Therapeutics, Philadelphia Polyclinic; Demonstrator of Pathologic Histology, University of Pennsylvania, Philadelphia.
- LOUIS STARR, M. D., PHILADELPHIA, PA.
Late Clinical Professor of Diseases of Children in the Hospital of the University of Pennsylvania; Late Physician to the Children's Hospital, Philadelphia.
- ALFRED STENGEL, M. D., PHILADELPHIA, PA.
Physician to the Philadelphia Hospital; Professor of Clinical Medicine, Woman's Medical College; Physician to the Children's Hospital; late Pathologist to the German Hospital, Philadelphia.
- G. N. STEWART, M. D., CLEVELAND, OHIO.
Professor of Physiology and Histology, Western Reserve University, Cleveland, Ohio.
- J. R. TILLINGHAST, JR., M. D.,
Assistant Physician to the Roosevelt Hospital, Out-Patient Department, New York City.
- J. HILTON WATERMAN, M. D., NEW YORK CITY.
Clinical Assistant, Hospital for Ruptured and Crippled; Clinical Assistant in Orthopedic Surgery, New York Polyclinic, New York City.

PREFACE.

THE most important change to be noted in the present YEAR-BOOK is the omission from the list of contributors of the name of Dr. William Pepper. Thus is again emphasized the fact that, as we look back upon the remarkable influence of this great man, the institutions and movements founded, inspired, or supported by his inexhaustible energy and wonderful versatility seem to be almost numberless. Subscribers to the present volume will find the best possible compensation for the loss of the senior editor of the department of General Medicine in the willingness of Dr. Stengel and Dr. Edsall to undertake the laborious and important task.

Each year adds to the enormous difficulty of condensing the results of the advances made in all departments of medical science within the limits set in previous volumes. But "practice makes perfect," according to the proverb; and therein lies the advantage gained by the consent of most of the remaining members of the editorial staff to continue the onerous duty of previous years with that expertness of intelligence in gleanings and ripeness of judgment in deciding as to values which can only be gained by experience and knowledge, and which are here prime essentials. Only by these qualities can the practitioner be certain that the collection shall not omit nor exaggerate the importance of any contribution, and, most needful of all, that it shall not be a mere undigested gathering of "all and sundry," leaving the physician, too busy for much reading, undecided and dazed as if by a multitude of clamorous voices.

One word of explanation seems necessary and due in justice to the departmental editors. A few queries and criticisms have reached us concerning the omission in previous volumes of some proposal, article, or discovery which was made public in the latter part of the year. Perhaps the original document only reached us quite a time after its date or its real publication; but in any case those who have had experience in bringing out a volume of the present size, the data for which, moreover, must in so short a period be drawn from every part of the world, will readily comprehend that several months are required even for the mechanical part of the work. The most skilful craftsman will blame the least.

GEORGE M. GOULD.

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GENERAL MEDICINE.

BY ALFRED STENGEL, M. D., AND D. L. EDSALL, M. D.,

OF PHILADELPHIA.

Progress During the Year.—The most substantial advances in general medicine during the year under review occurred in the department of infectious diseases. Continued investigations have more firmly established the Widal test as one of great practical usefulness, and have more clearly demonstrated its limitations. Statistics show beyond question that the serum-test gives a positive result, sooner or later, in practically all cases of typhoid infection, and a negative result in cases in which typhoid infection is not present and has not existed in the patient examined. It is very important to distinguish between typhoid fever and typhoid infection, as a considerable number of cases have been recorded in which the lesions and symptoms of typhoid fever were absent, but in which the bacillus was discovered in the tissues. Some of the cases recorded as positive Widal reactions in non-typhoid patients may be explained as instances of such typhoid infection; and, further, it is not improbable that such an infection, previously sustained, may explain cases in which the reaction was obtained, though the patients had no evidence of typhoid infection at the time and no history of typhoid fever in the past. Another fact that must be recognized is, that the Widal reaction often fails during the first week of the disease, and sometimes much longer. Repeated examinations are necessary in every case. The attempt has been made to determine some sort of relation between the intensity of the reaction and the prognosis, but with little success thus far. In the department of treatment of infectious diseases interesting contributions have been published regarding yellow fever and the plague. The bacillus of Sanarelli is quite generally accepted as the probable cause of yellow fever, and the experiments at producing a protective and curative serum are suggestive, though by no means conclusive. The results in the treatment of the plague have been more satisfactory.

Koch's newer treatment of tuberculosis has been widely discussed. It cannot, however, be regarded as meriting a place in established therapeutics.

INFECTIOUS DISEASES.

GENERAL CONSIDERATIONS REGARDING INFECTIOUS DISEASES.

E. Fischl¹ has experimented upon rabbits to determine the **effect of cold** in favoring infection. Animals that had been subjected to cold were always infected with the pneumococcus to a greater degree than those that had not been exposed to cold. Three of the former series died from pneumococcus-septicemia, while none of the control-animals succumbed. A. Chelmonski² has investigated the effects of cold in causing skin-reaction in individuals suf-

¹ Zeit. f. Heilk., Bd. xviii.

² Deutsch. Arch. f. klin. Med., Oct., 1897.

fering from various affections. He concludes from these investigations, and from general considerations, that cold does not, in the ordinary sense, produce disease, since its effect is but slight, merely preparing the way for micro-organisms. Severe cold usually has less effect than a moderate degree of cold, since the former causes more marked reaction. The grade of the reaction of the skin to cold indicates whether a patient will readily take cold or not, and this reaction is not constant in the same individual. Elderly people, those with fever, and those with diseases of the kidney seem especially predisposed. There is no relation between the reaction and the condition of the patient's nutrition or of his temperature-sense. The proper method of protecting against cold is not to wear an excessive amount of clothing, but to stimulate the skin to rapid reaction.

H. W. Gardner¹ adduces further proof that **ordinary "colds"** are infectious. Nansen wrote him that neither he nor his companions caught cold while in the Arctic regions, but that all of them immediately took cold when they returned to Norway. A very similar communication was received from Köttilitz, who was the medical officer to the Jackson-Harmsworth expedition. Gardner also mentions instances of horses developing colds at once when brought from fields into a stable. [It is a common experience that great exposure causes little disturbance to persons living in the open air in mountainous regions or at the seashore, while comparatively little exposure in cities causes catarrhal troubles. The writer has had a number of striking experiences of this sort.]

Coste² has investigated the **pupillary reflex** in certain infectious diseases, and finds it normal in scarlet fever, measles, and variola, excepting in hemorrhagic small-pox, in which it is more or less abolished. In typhoid fever its occasional absence seems to depend upon the existence of pulmonary complications. The reflex was totally paralyzed in infectious endocarditis and in fatal cholera. In puerperal fever it was present, excepting when there was peritonitis or endocarditis, and he believes that in an abdominal affection the condition of the pupil indicates whether the peritoneum is involved or not. [Generalizations of this kind do not often prove of value in practice, and we cannot, in particular, substantiate several of the statements of the author just quoted.]

R. Schmidt³ has investigated the condition of **metabolism** in a patient who was the subject of the **toxic influences** of a miliary actinomycosis. It was found that of abnormal elements in the urine albumin and peptone (?) were found in traces, while urobilin was present in extremely slight amount. Acetone and sugar were absent; the nitrogen-excretion largely exceeded the ingestion; the reaction of the urine was not distinctly changed; the urea was slightly decreased. The alloxur-bodies varied proportionally to the variation in the excretion of nitrogen. The uric acid bore no definite relation to the amount of xanthin-bases. The ammonia was not increased, while the total sulphates bore a direct relation to the amount of nitrogen, but the ethereal sulphates were not increased. The excretion of the phosphates was not changed, except that there was a slight decrease in the amount of earthy phosphates and chlorids.

H. M. Biggs⁴ gives a review of the methods used by the **New York Health Board** in isolating infectious cases, in disinfection, and in the instruction of the public in regard to infectious diseases. The work done by the Department may be appreciated from the facts that, during 1896, 25,049 cul-

¹ Birmingham Med. Rev., Mar., 1898.

² Quatrième Congrès Franç. de Méd. int., 1898.

³ Centralbl. f. innere Med., Feb. 26, 1898.

⁴ Med. News, Sept. 11, 1897.

tures were examined for diphtheria-bacilli and 16,796 vials of antitoxin were issued, many of the patients being treated by assistants of the Health Department.

Lochelougue¹ has studied the effect of **saline injections**, given either intravenously or subcutaneously. The results in infectious diseases are an almost constant rigor, with a rapid pulse and dyspnea, these symptoms being followed by free perspiration and a sense of well-being, with decrease in the temperature, polyuria, and, occasionally, severe diarrhea. If this improvement is not permanent another injection will usually make it so, though sometimes the patient is so profoundly infected that the injections have no effect. Their action in intoxications has not been sufficiently studied, but in some of the infectious diseases, and in diabetes, uremia, and paroxysmal tachycardia, their use has resulted in improvement of the general condition, with increase of blood-pressure, and improvement in other ways already noted. The subcutaneous method is preferable, but it may be preceded by venesection, and the latter procedure is indicated in uremia.

E. W. Sanders,² John Zahorsky, and C. Fisch recommend the use of **pilocarpin** in acute infectious diseases for the purpose of aiding in elimination of toxins. They believe also that it aids in the formation of antitoxins, since they have injected two series of guinea-pigs with equal amounts of diphtheric toxin and with insufficient amounts of antitoxin, and have found that the guinea-pigs which received injections of pilocarpin in addition to antitoxin survived, while the others did not. Besides diphtheria, they have found it of use in scarlatina, influenza, and erysipelas. In the latter it causes amelioration of the symptoms, but does not shorten the course of the disease. They have not found the drug dangerous, and recommend that it be used in doses sufficiently large to produce a marked physiologic effect. [We cannot agree that pilocarpin is free from danger in doses sufficient to produce a distinct effect. We have seen dangerous pulmonary edema follow its administration.]

TYPHOID FEVER.

Etiology.—Earnest Hart³ renders a report of great interest in explaining the origin of epidemics of typhoid fever. It is sufficient to convince the most skeptical of the danger of improper **water-supplies**, either from wells that are liable to pollution or from city supplies which are polluted from the deposit of excreta in streams used for water-supply, by drainage from manured fields, or from various other sources. He includes the histories of 205 epidemics, all of which had their origin in the water-supplies. In one epidemic which he mentions, 322 people became ill from infection through milk, owing to the fact that the cans were washed with polluted water.

The special commissioner of the *Lancet*⁴ reports, in regard to the **epidemic of typhoid fever at Belfast**, that there was one rapidly developed epidemic localized to the district of Ligoniel, and another epidemic, which developed more slowly, but was more persistent, was in the town of Belfast itself. The first-mentioned was evidently due to the water-supply, which came from a spring that had been contaminated by a case of typhoid fever near by. Typhoid-bacilli were found in the water. The epidemic in Belfast was more difficult to explain, and the water-supply could not be directly incriminated, though it could not be proved that this was not at fault. The existence of some 20,000 cesspits in the town was suspected to be of etiologic importance.

¹ Thèse de Paris, 1897.

² Therap. Gaz., Jan., 1898.

³ "Water-borne Typhoid," 1897.

⁴ Lancet, Nov. 27, 1897.

A. R. v. Dobrzyniechi¹ reports an epidemic of typhoid fever occurring in a barracks. The water was examined bacteriologically and chemically and showed nothing abnormal, but subsequent examination of the water-pipes showed that there was a leak which was directly infected by sewage containing human dejecta. After disinfection of the sewer and repairing of the leak the epidemic ceased. Private soldiers were affected almost exclusively, the petty officers escaping, probably because of their receiving better nourishment, and being therefore in better condition. G. E. Ranney² gives a study of an epidemic of typhoid fever at St. Clair, Mich., in which the infection seemed to be indubitably traced to a privy which emptied into the river above the water-works. The intake for the city-water was also in such position as to be readily contaminated by other sewage. Bacteriologic examination of the water showed the presence of a bacillus presenting the characteristics of the bacillus of Eberth. G. M. Kober³ reports that in his belief the high mortality from typhoid fever in Washington, D. C., is due to the impure water-supply, many of the residents of the city using well-water or Potomac water, which is contaminated with sewage-bacteria. Since a large number of wells have been closed the morbidity has distinctly diminished.

D. S. Davis⁴ gives an interesting account of his search for the source of infection in the epidemic of typhoid which occurred in Clifton, England. He was finally able to trace 195 out of 208 cases to an infected **milk-supply**. Riedel⁵ discovered that all of the cases in an epidemic of typhoid which affected 25 people in one of the suburbs of Lubeck had obtained their milk from one source, and that the cause of infection was evidently a previous case of typhoid fever in a child of the milk-dealer. The infection had probably been carried by washing the milk-cans in water infected by the child's dejecta. F. Harbitz⁶ investigated an epidemic of typhoid fever which appeared in Christiania, and was able to determine that the majority of the cases got their milk from a supply that was infected. Fränkel and J. Kister⁷ found typhoid-bacilli in several specimens of **buttermilk**, and conclude from this that the disease may be carried by this food.

C. Childs⁸ gives a historic study of the occurrence of typhoid fever in Munich, and after an examination of the subsoil-conditions and of the water-supply decides that the great decrease in the disease has been due to improvement of the drainage, rather than to improvement in the water-supply, since he finds that **pollution of the soil** bears a constant relation to the disease. Childs insists that soil-conditions should be more carefully studied in endeavoring to prevent the occurrence of typhoid fever in thickly settled regions. [Attention to conditions of soil is undoubtedly advisable, but the weight of opinion is not favorable to the Pettenkofer view regarding the essential importance of the soil.]

Geannel⁹ observed an epidemic of typhoid fever in which the infection was due to spreading the dejecta of a typhoid case upon a street, communication to others occurring through the **dust of the street**. Children were the chief and earliest victims, and this is explained by their playing in the street and carrying the dirt to their mouths. [Self-infection by conveying the organism to the mouth by dirty hands is probably more frequent than is generally believed. Nurses are often careless in cleansing their hands, and

¹ Der. Militärarzt, July 9, 1897.

² Nat. Med. Rev., Nov., 1897.

³ Zeit. f. Med.-Beamte., Heft 3, 1898.

⁴ Münch. med. Woch., Feb. 15, 1898.

⁵ Clinical Rev., May, 1898.

⁶ Lancet, Dec. 4, 1897.

⁷ Norsk Mag. f. Lægevidensk., Aug., 1897.

⁸ Lancet, Feb. 5, 1898.

⁹ Quatrième Congrès Franç. de Méd. int., 1898.

several times we have felt assured that typhoid fever was contracted in this way in cases under our observation. We have repeatedly found that nurses after bathing their patients simply dried their hands and arms without disinfection.]

L. Guinon¹ has observed 3 cases of what he considers undoubted **hospital-contagion** of typhoid fever. They occurred in children, one of which had acute poliomyelitis; the second, a simple purpura; the third, bronchitis. The first signs of the disease appeared in 2 cases 40 days after admission, and in the other case on the twenty-second day after admission. The children were in a ward in which there were a number of typhoid cases, and this ward was badly ventilated and crowded, and the appliances were insufficient. [We have recently observed two house-epidemics in Polish families living under wretched conditions. In each case the mother and two young children were affected; the children had slept in their mother's bed after her illness had begun. It is difficult in such cases to determine whether all were originally infected from a common source, or whether the children were directly infected by the mother.]

Troisier² states that he saw typhoid fever develop in a young girl who was in the hospital for pleurisy, and who had been surrounded by typhoid-fever patients. Netter, in discussion, stated that he had seen 27 similar cases, 12 of which occurred in attendants. Gaillard had seen 1 case of typhoid fever contracted while in hospital, and Richardière observed a case of contagion in which pulmonary symptoms were very pronounced, and in which he suspected that the infection had been through the respiratory tract.

Lépine³ records the case of a girl of 19, who was in a hospital for treatment for epilepsy. She had assisted in the care of a typhoid patient. One month after her entrance she contracted severe typhoid fever and died. She was the only patient who had come in contact with the typhoid case, and the only one that acquired typhoid fever.

Petrushchy⁴ describes a case of infection with typhoid fever that occurred in a peculiar way. A typhoid patient in a semi-stupid condition voided urine into a champagne-bottle. The nurse took some of this afterward, not knowing that the bottle did not contain champagne, and although she vomited she developed typhoid fever 12 days after **swallowing the infected urine**.

Pathology.—Chiari⁵ divides the **atypical manifestations** of typhoid, in a pathologic sense, into, first, irregular lesions in the intestines, among which one may see extensive necroses or location of the lesions in portions of the intestine where they are unusual—they may even occur in the stomach; second, there are unusual inflammatory changes caused by an uncommon localization of the typhoid bacilli, and these may cause lesions in almost any portion of the body; and, third, there are cases in which there are absolutely no lesions, but there exists a pure typhoidal septicemia. Of the 19 cases which Chiari had examined in the 5 months preceding his report, there were 5 in which the condition was a pure septicemia, and from this he warns one that even the absence of typhoidal lesions is not sufficient to negative a diagnosis of typhoid fever, and is not sufficient to be used as an argument against the Widal reaction if this has been positive during life, unless cultures taken from various parts of the cadaver show no typhoid bacilli.

Cheadle⁶ records a case of **nonintestinal typhoid** in a boy 3 years

¹ Bull. de la Soc. méd. des Hôp., Dec. 10, 1897.

² Indépendance Méd., Dec. 22, 1897.

³ Gaz. hebdom. de Méd. et de Chir., Jan. 6, 1898.

⁴ Centralbl. f. Bakt. Parasit. u. Infek., vol. 23, p. 530, 1898.

⁵ Zeit. f. Heilk., xviii., 1897.

⁶ Lancet, July 31, 1897.

of age, whose clinical history and symptoms were those of typhoid fever, excepting that there was no enlargement of the spleen and the stools were not characteristic. Spots were, however, present. The postmortem showed that there were absolutely no typhoid lesions in the intestines, but typhoid bacilli were cultivated from the spleen and the Widal test had been positive during life.

S. Flexner and N. M. Harris¹ record a similar case of typhoid fever **without intestinal lesions**. The subject was a man of 68 years, whose symptoms had been dyspnea, with abdominal pain and marked weakness. There were harsh respiration and friction-rub on the right side. At the autopsy the interesting fact was that typhoid bacilli were discovered in various parts of the body, but there was no local evidence of the disease.

A. G. Nicholls and C. B. Keenan² record a case which during life presented all the symptoms of typhoid fever, including a typical Widal reaction. At the autopsy there was found enlargement of the spleen and of the mesenteric glands, but no inflammation or ulceration of the intestines. The typhoid bacillus was, however, obtained from the mesenteric glands, and was seen in the spleen upon examination of sections.

E. Hodenpyl³ records a case of typhoid fever **without characteristic lesions** of the small intestine. After a review of the literature he details his case. A man, aged 31, with a history of a week's illness, was admitted to the hospital. He lost his appetite and had headache and diarrhea. The diarrhea was moderate at first and attended with pain; later, it became severe. There were continuous fever and prostration. On admission the face was flushed; the tongue coated in the center, red at the edges, and tremulous. The pulse was irregular, but rapid. The patient was apathetic, the belly rather tympanitic, and there were a few typhoid spots. Temperature, 104.2° F.; respiration, 28; pulse, 114; urine, negative. There were râles in the chest and a systolic murmur over the heart. The spleen was apparently not enlarged. Death occurred on the seventeenth day. At the autopsy both lungs were edematous, the heart-muscle flabby, and there was marked thickening of one cusp of the mitral valve. The spleen was moderately enlarged and soft; the liver and kidney pale. There were no lesions of any kind in the lymphatic structures of the small intestine, but the colon was dilated and thickly studded with ulcers, circular in outline, 2 to 15 mm. in diameter, and with sharp edges. The typhoid bacilli were isolated. [This case is an interesting example of typhoid fever with lesions affecting the large intestine alone. Such cases are not particularly rare; they are rather intermediate between typical instances and such as present no intestinal lesions of any kind.]

Symptomatology.—J. Köller⁴ has studied the **changes in the blood** in 23 cases of typhoid fever, and found, in uncomplicated cases, that there is always a hypoleukocytosis. The grade of this did not correspond to the severity of the case, though in a number of cases, when the patient became distinctly worse, the leukocytes decreased still more, and during the most severe period of the disease—namely, in the second and third weeks, the leukocytes were usually at their lowest point, and began to increase in number before the temperature reached the normal. As to complications, he found in one case with pneumonia a slight leukocytosis (11,200), but in another complicated with pneumonia and purulent otitis media the leukocytes decreased to 1000. After hemorrhage there was an increase of the leukocytes, but not an actual leukocytosis. The percentage of neutrophils was at first increased, afterward

¹ Bull. Johns Hopkins Hosp., Dec., 1897.

² Montreal Med. Jour., Jan., 1898.

³ Brit. Med. Jour., Dec. 25, 1897.

⁴ Deutsch. Arch. f. klin. Med., Apr. 7, 1898.

decreased, while the other elements increased in number. There was no definite prognostic indication to be found in the study of the leukocytes. The red cells decreased on the average about 20%. The hemoglobin decreased about 33%. The increase in these factors during convalescence was strikingly rapid in those who had become severely anemic; less rapid in the less anemic.

W. Pepper and A. Stengel¹ discuss **abrupt onset** in typhoid fever, and divide the cases with such onset into two classes: the gastro-intestinal form and the catarrhal form. The former is associated with vomiting, epigastric pain, and high fever. The catarrhal form is likely to resemble grip. Of symptoms of some value pointing to typhoid fever, in the early stages of such cases, they mention the pronounced loss of appetite, splenic enlargement, epigastric pain, and, of more importance in their opinion, the relatively slow pulse-rate.

M. Manges² thinks that **typhoid fever** is often overlooked in the **aged**. He records 5 cases which occurred in patients above 60 years of age, in which the temperature was usually low, and in 2 of the cases went frequently below normal. The course of the fever was irregular, and in 2 cases there were during its course severe chills. One of the cases had had a severe attack of typhoid fever 45 years previous to the one reported, but in the attack reported the spleen was not distinctly enlarged and there were no typical spots. The author does not state whether the case reacted to the Widal test. The fever in this instance continued for 3 weeks, and was followed by a relapse which persisted for about 3 weeks.

Lyonnet and Maurice³ have studied **typhoid fever in the obese**. In 30 such cases the mortality was 73%; the disease is always gravest in fat subjects, the chief cause of death being cardiac weakness. In the 30 cases reported there were 11 fatal intestinal hemorrhages. Obese subjects have a considerable resistance to the bath-treatment of the fever; the baths oftentimes do not bring down the temperature, and may even cause it to rise.

R. S. Skirving⁴ has studied 500 cases of typhoid fever treated in the Prince Albert Hospital at Sydney. Of these, 404 were constipated, while 76 had **diarrhea**; 88 of the 500 died, and of these 88, 53 had diarrhea.

Weill and Peary⁵ report a case of typhoid fever with a temperature constantly normal or subnormal throughout the entire course of the disease, but with such characteristic symptoms of typhoid fever that they believe there was no doubt as to the diagnosis. They therefore include it among the instances of **apyretic typhoid fever**.

A. Dickson⁶ records a case of typhoid fever in which the **temperature** showed during the third week the most astonishing **variations**, as great as seven degrees in the 24 hours, and on 2 days eight degrees. There were no complications and the patient recovered.

Complications and Sequelæ.—J. M. Da Costa⁷ discusses **post-typhoid fever**, as he prefers to call that fever which is apt to occur directly after an attack of typhoid fever and has no explanation for its existence. The fever is of moderate but continuous character, usually lasting 8 to 10 days, though of uncertain length. It is commonly almost continuous with the original attack, but associated with no other symptoms of a relapse. The cause is uncertain, but Da Costa inclines to the belief that it is neurotic, and

¹ Phila. Med. Jour., Jan. 8, 1898.

² Med. Rec., Feb. 26, 1898.

³ Gaz. hebdom. de Méd. et de Chir., p. 431, May 5, 1898.

⁴ Australas. Med. Gaz., Dec. 20, 1897.

⁵ La Province méd., Nov., 1897.

⁶ Brit. Med. Jour., Apr. 16, 1898.

⁷ Phila. Med. Jour., Jan. 1, 1898.

is due to an instability of the long-disturbed heat-centers—a fever-habit, so to speak, having been acquired. The best treatment is rapid but cautious increase in diet, tonics, and allowing the patient to sit up a little, increasing the time he is up as rapidly as possible. The temperature should be taken only very rarely.

G. B. Hunt¹ states that **relapse** occurred in 28 of 71 cases of typhoid fever recently treated in the University College Hospital of London. In 2 cases there was double relapse, and in 1 case there were three relapses. On the average the fever lasted 16 days in the relapse. In 15 of the cases it rose again before the temperature reached normal. Such cases he would call “inter-current relapses,” to distinguish them from relapse after an interval of apyrexia. When an interval of apyrexia occurred it averaged 8 days. The frequency with which relapse occurred was not explainable. The patients were not treated with cold baths, and were given strict diet. In 2 interesting cases typical spots continued to appear after the temperature had fallen, but no relapse occurred.

W. Osler,² in discussing relapses in typhoid fever, limits the term to distinct re-infection after a definite period of apyrexia. Of 500 cases treated in Johns Hopkins Hospital, 8 presented relapses, but few of them more than once, and none 3 times. One **extraordinary case** had two long relapses, the second and third separated by 6 weeks of apyrexia, and the whole disease persisting for nearly six months. The temperature did not always take the course of the original temperature, but often went up very suddenly in the beginning. There seemed to be no increase in relapses in those cases treated by the Brand method.

T. McCrae³ records a case of typhoid fever in which a relapse began with **severe glossitis**, but recovery of the latter condition ensued upon puncturing the tongue. He draws attention to the rarity of this complication.

R. G. Curtin⁴ gives the statistics of 60 cases of typhoid fever, complicated by **hemorrhage** from the bowels, which occurred in his practice. The age in which it was most frequent was between 20 and 30. The frequency of the complication has increased in late years, since the introduction of the Brand method, but during the same time influenza had been occurring epidemically, and it is quite probable that the latter disease may be important in increasing complications. He believes, however, that the cold pack or bath, if used at all, should be administered with great care during the third week. In 26 cases the temperature fell after hemorrhage, in 9 there was no effect, while in 7 it became immediately elevated. The associated symptoms which made the prognosis seem bad were a distended condition of the abdomen, which would tend to keep the blood-vessels patulous; an associated renal trouble; marked organic heart disease; and hemophilia.

T. v. Openchowski⁵ records a case of typhoid fever which was complicated with persistent **hemorrhages** from the **mucous membranes**. The hemorrhages were not influenced by the usual styptics, but suddenly the blood began to clot and the hemorrhages stopped. Signs of croupous pneumonia appeared the next day.

A. C. F. Halford⁶ gives the notes of a case of typhoid fever in which the diagnosis was confirmed by the Widal test and by post-mortem, and in which, during a relapse, the patient **vomited** as much as 13 oz. of **bright-red blood**, and at the same time passed blood from the bowel. No lesion of the

¹ Practitioner, Mar., 1898.

² Bull. Johns Hopkins Hosp., May, 1898.

³ Klin. Therap. Woch., Jan. 2, 1898.

⁴ N. Y. Med. Jour., July 17, 1897.

⁵ Jour. Am. Med. Assoc., Sept. 25, 1897.

⁶ Australas. Med. Gaz., Sept. 20, 1897.

stomach was found after death; the blood probably came from the small intestine. [The possibility of esophageal ulceration must also be remembered.]

In a discussion, J. A. Lindsay¹ mentions a case of typhoid fever in which there was repeated **hyperpyrexia with rigors**, the temperature staying for a time steadily at 108° F. No septic causes could be discovered, and the patient recovered.

H. C. Wood² records a case with irregular symptoms and course of fever suggesting sepsis or **cerebro-spinal meningitis**, but which subsequently proved to be a case of typhoid fever with an abscess which ruptured into the intestine. The Widal reaction was absent until the twenty-seventh day. Kühnau³ reports a case in which, during severe typhoid fever complicated by hemorrhage, the symptoms of **meningitis** of the brain came on on the thirty-second day, and death occurred on the thirty-sixth day. Typhoid lesions were found in the intestine, and over the brain there was an exudation of pus in which typhoid bacilli were present. The bacilli were also found in the mesenteric glands, the spleen, and, during life, in the blood.

Poix and Gaillard⁴ saw **neuritis** of the brachial plexus with atrophy of the muscles of the shoulder follow upon typhoid fever in a man of 22 years.

A. Dauriac⁵ studies the character and extent of **biliary infections** in typhoid fever. These may arise either through the blood or through direct entrance of the typhoid bacillus from the intestinal canal. Infection through the blood of the arterial system is extremely rare. After the bacillus arrives in the biliary passages it may remain quiet, either losing or retaining its virulence, or it may cause an angiocholitis of purulent or simple nature. To this, biliary lithiasis may be added, or grave icterus may result. Finally, cirrhosis may ensue. The lesions always tend to be ulcerative, as they do in the intestine. The symptomatology of angiocholitis is apt to be variable and may be masked, but the onset is usually abrupt, with pain and, usually, icterus. The liver swells, and there are vomiting and a rise of temperature. The general condition usually grows worse, and finally death occurs. In cholecystitis the main symptoms are pain in the hypochondrium, a rounded tumor in the region of the gall-bladder, and increase in the size of the liver. Secondary infections occur in a number of cases, and other micro-organisms than the Eberth bacillus may be found. The prognosis in the mild cases is good, but in suppurative cases it is very unfavorable. When the biliary trouble occurs during the course of typhoid fever, especially during the latter part, the prognosis is bad. If, however, the liver-affection appears during convalescence, the chances are better.

William Osler⁶ discusses the **hepatic complications** of typhoid fever under four heads, the first being the focal necroses which give rise to no symptoms, though it is possible that they might cause an icterus gravis if extensive, or subsequently lead to cirrhosis; the second complication, jaundice, is very rare, and Osler saw no case in his first 500 at the Johns Hopkins Hospital; the third complication is abscess, which is rare, solitary abscess and that due to suppurative pylephlebitis being particularly rare, though it is somewhat more common when secondary to the complications of the disease. The most common hepatic complications are affections of the bile-passages, and he cites Chiari's studies to show the importance of affections of the gall-bladder. He then considers the possibility of typhoid fever causing the formation of gall-stones.

¹ Brit. Med. Jour., May 21, 1898.

² Am. Medico-Surg. Bull., Feb. 10, 1898.

³ Berlin. klin. Woch.

⁴ Quatrième Congrès Franç. de Méd. int., 1898.

⁵ Gaz. hebdom. de Méd. et de Chir., July 25, 1897.

⁶ Edinb. Med. Jour., Nov., 1897.

These may form owing to a catarrh set up by the bacilli, though calculi in the gall-ducts will, on the other hand, give a much more favorable nidus for the growth of the bacilli, and it is difficult to say whether the gall-stones are primary or secondary.

M. W. Richardson¹ found typhoid bacilli in the fluid removed from a case of **cholecystitis**. The patient had acute cystitis 5 weeks before operation, and 1 week later there was steady rise of temperature, with pain in the cecal region and a typhoidal look. The temperature continued, and a tumor appeared on the right side, which upon operation proved to be the distended gall-bladder. The patient's blood-serum gave no Widal reaction at the time of the operation, and no typhoid bacilli could be cultivated from the stools, but the fluid from the gall-bladder gave a well-marked Widal reaction, and there were large clumps of bacilli found in the fluid itself. Richardson regards this observation as evidence of a gigantic serum-reaction which had occurred spontaneously in the gall-bladder. Whether this infection of the gall-bladder was primary or secondary he is unable to state, but the importance of infection of this cavity by typhoid bacilli is now known to be very great. In 3 autopsies upon typhoid patients, typhoid bacilli were discovered in the gall-bladder in every case. In one case there was associated tuberculosis, which caused death 6 weeks after convalescence had begun, and tuberculosis of the intestines was found post-mortem, so that it seems to have been an instance of **double infection** of the intestine with **typhoid** and **tuberculosis**.

O. V. Wunschheim² describes a case of suppurative and necrotic **cholecystitis typhosa**, the patient dying in the middle of the fourth week. The lesions of typhoid fever were found after death. The gall-bladder was enormously distended, and contained yellowish-brown pus. Its walls were necrotic, and there were a secondary peritonitis and ulceration of the exterior coats of the transverse colon, together with a purulent peritonitis. Typhoid bacilli were found in the gall-bladder, the bile-ducts, and in the pus in the peritoneal cavity, and, upon histologic examination, in the necrotic areas in the walls of the gall-bladder.

M. H. Fussell³ gives the history of a case of **laryngeal perichondritis** complicating typhoid fever. There had been hoarseness from the beginning of the disease, as well as some respiratory distress. A laryngeal examination showed only slight abrasions until late in the disease, when there was narrowing below the cords. Tracheotomy was refused, and the patient died. Post-mortem there was, posteriorly, a necrosis of the thyroid cartilage with an abscess. G. Duffey⁴ records a case of **laryngeal necrosis** occurring in a case of typhoid fever at about the thirty-seventh day and causing death. At the post-mortem there was no ulceration in the larynx, but an abscess was found at the external and posterior surface of the cricoid cartilage.

A. A. Eshner⁵ reports a case of **orchitis** occurring in the convalescence from typhoid fever, and presents a table of 43 other cases from literature. The complication is somewhat rare. It usually involves but one side, and commonly terminates in resolution, though atrophy or suppuration may occur. The complication commonly arises during convalescence, and is ordinarily due to infection through the blood. [One case of this kind has occurred in our experience. The complication appeared at the end of the second week of the attack. There was considerable swelling of the testis, but very little pain; and prompt resolution followed.]

¹ Boston M. and S. Jour., Dec. 2, 1897.

² Prag. med. Woch., Jan. 13, 1898.

³ Jour. Am. Med. Assoc., July 3, 1897.

⁴ Dublin Med. Jour., Mar. 1, 1898.

⁵ Phila. Med. Jour., May 21, 1898.

Löw¹ records a case of **osteomyelitis** following typhoid fever, the pus of which contained virulent typhoid bacilli. The development of the osteomyelitis seemed to be caused by overstrain and pressure upon the diseased femur during hard work.

Diagnosis.—The Widal Reaction.—S. F. Freyer² has used the Widal test to settle the question of the **supposed immunity** of the **natives of India** to enteric fever. He finds that the reaction is not present in infants, but is in many children of 2 years old or upward, and he concludes from this that typhoid fever is so widely spread among these people that but few of the youngest children escape it. His explanation of the increasing mortality of the British soldier in India from typhoid fever is, that in former days hygienic conditions in soldiers' homes in Great Britain were about equal to those in India, and he had probably had the disease long before his arrival in India, and was therefore immune. Now sanitary conditions are so improved in Great Britain that he does not acquire the disease there, and is so much the more susceptible to the conditions existing in India.

Vincent³ has observed that Arabs suffer from typhoid fever much less frequently than do the French soldiers, and he considers this a natural immunity, such as the negro race exhibits to yellow fever. He found in 21 examinations of Arabs no indication of a serum-reaction, so that previous infection seems to be excluded. He would also use this observation upon the reaction as proof that the reaction is one of infection, and not of immunity.

A. S. Grünbaum⁴ reviews various theoretic and practical points regarding the **serum-diagnosis** of typhoid fever and other diseases. He holds that the **Widal reaction** is one of immunity, and not of infection. The test has proved applicable to other diseases than typhoid fever, but the author points out that it should not be made after injection of any antitoxic serum.

Taty⁵ directs attention to the importance of the Widal reaction as a means of diagnosis in those forms of typhoid fever which are associated with melancholic symptoms, and do not show any symptoms of typhoid which are sufficient readily to establish a diagnosis.

Levy and Gissler⁶ have found the test of great value in 2 cases in especial, as in both there was a suspicion of puerperal sepsis. One case reacted, and post-mortem there were found both typhoid lesions and septic infection. The other case did not react, and there was sepsis without typhoid. They condemn the dry method because of its great inaccuracy of dilution. They use a pipet like that used in counting leukocytes, in order to obtain an exact dilution. After an examination of 115 cases they decide that the agglutinating power of the serum bears no relation to the severity or the period of the disease; but if the reaction becomes more intense, it usually indicates some increase in immunity, though there is no definite relation between these factors. In one case that died with a slight reaction the fluid in the serous cavities showed no agglutinating power. In 10 of 22 cases they found the typhoid bacillus in the urine, and with it some albuminuria, and this discovery emphasizes the fact that the urine should be disinfected in all cases of typhoid fever. The authors believe that the reaction is one of immunity, but that there are other factors than the agglutinating principle that produce immunity.

Tschistovitch⁷ discusses the **prognostic value** of the Widal reaction. In 80 cases tested by Yefifanoff the reaction was usually more feeble in severe

¹ Wien. klin. Woch., Dec. 23, 1897.

² Bull. de l'Acad. de Méd., May 10, 1898.

³ Lyon méd., Nov. 7, 1897.

⁴ Brit. Med. Jour., Aug. 7, 1897.

⁵ Brit. Med. Jour., Dec. 25, 1897.

⁶ Münch. med. Woch., Dec. 14 and 21, 1897.

⁷ Bolnitchnaya Gazeta Botkina, No. 51, 1897.

cases, while in those showing a marked reaction the course was usually favorable. He investigated the reaction in cold-blooded and warm-blooded animals which had been injected with cultures of typhoid bacilli, and found that the cold-blooded animals developed but little agglutinating power, and this appeared only after about a month, while the warm-blooded animals showed early and marked reaction. In the latter the leukocytes decreased in number for several days, and the reaction appeared when the leukocytes had reached their lowest point and had begun to increase. The author is inclined to consider the reaction one of immunity. The cold-blooded animals are unfavorable for the growth of bacilli, while phagocytosis is very active in them, and in one triton the leukocytes were found full of bacilli. But his general conclusion is that the test is not of much value in prognosis, as so many collateral causes may influence the outcome.

Gnude¹ has studied 50 cases of typhoid fever with the Widal test, and finds that the intensity of the reaction has no relation to the severity of the disease or the height of the fever, and that no prognostic value can be attached to the test.

R. C. Cabot,² from his experience with 401 cases, decides that the test has no prognostic value.

Courmont³ believes that the degree of agglutinative reaction possessed by the serum of typhoid cases is of prognostic value. If there is a progressive rise and then fastigium which coincides with the fall in temperature, and which is followed by a descent similar to the fall of temperature, the prognosis is favorable. In serious cases the agglutinative power was slight. Retardation of the reaction was of no prognostic importance. Mills⁴ found that in 28 serum-reactions the rapidity of the agglutination was in inverse ratio to the virulence of the culture used. The reaction appeared sooner with bacilli from the individual cases than with other bacilli in 2 of 8 cases so examined, but only after a longer time in the other 6. He thinks that the agglutinating power rises with the severity of the infection up to a certain point, but in the most severe cases it is either slow or absent. Widal⁵ has tested 350 cases, not typhoid fever, with serum of a dilution of 1:10, and has never obtained a positive reaction. He stated earlier⁶ that he had examined 177 cases of typhoid, in but one of which did he find the reaction absent. In this one case, in which the test did not conform to the clinical history, cultures made by puncture of the spleen showed the typhoid bacillus. Widal contends that the reaction should be carried out carefully after the method he has prescribed, and the agglutinating power of the serum should be measured. He questions whether some of the negative examinations are not explained by their having been made immediately before death, at which time he finds the reaction often disappears. When positive examinations seem in error, there should be careful inquiry into the previous history of the cases and as to the occurrence of so-called gastric fever and other like conditions.

H. M. Bracken⁷ says that there have been over 1800 examinations of blood for the Widal reaction in the laboratory of the Minnesota Board of Health in the previous 10 months, and the results have usually corresponded to the clinical course. In some cases the reaction was positive when the disease subsequently ran a non-typhoidal course, and he suggests, to explain this, the possibility that there may be **typhoidal infection without clinical typhoid**

¹ Soc. di Bologna, Dec. 17, 1897.

² Jour. Am. Med. Assoc., Aug. 14, 1897.

³ Lyon méd., Aug. 8, 1897.

⁴ Proc. Internat. Med. Congress, Moscow, 1897.

⁵ Ibid.

⁶ Gaz. hebdom. de Méd. et Chir., Sept. 19, 1897.

⁷ Phila. Med. Jour., Feb. 19, 1898.

fever; that people may become partially immune to the disease by constant exposure to the infection; and that they may be able to overcome the disease within a very short time.

H. M. Bracken¹ records a case in which a child was born on the third day of its mother's illness from typhoid fever. Two days later the **infant's blood** gave a **marked reaction**. This may have been due to passage of the agglutinative principle through either the placenta or the mother's milk, since the child had been put to the breast before the blood for the Widal reaction was taken. [In the case of an infant born to a woman in the second week of typhoid we could obtain no reaction. The temperature of the child at birth was over 101° F.]

Landonzy and Griffin² have observed agglutination of the typhoid bacillus by the serum of a baby whose mother had typhoid fever 3 months after confinement, and who continued to nurse her child up to the second week of the disease. H. B. Shaw³ reports that the blood of a child born of a mother who had typhoid fever in the fifth month of pregnancy gave no Widal reaction when tested at five weeks of age, though the mother's blood still reacted at this time.

J. P. Barber⁴ records his results from 205 Widal tests: 156 were positive and 49 negative. In none of the positive cases could typhoid fever be excluded; in none of the negative was it distinctly present. He compares the Widal test with the diazo-reaction, and finds that the latter is less frequently present, and although it appears earlier than the serum-reaction, it is necessary to confirm it by the serum-test, as it is apt to occur in other diseases. The author records the case of an infant, born of a mother in the first week of typhoid, whose blood gave the reaction when it was two days old.

Wilson and Westbrook⁵ record the results of their examination of 817 cases of suspected typhoid fever by the Widal method, and of 76 cases of other diseases. Of the latter, 1 of influenza, 1 of acute mania, 1 of puerperal mania, and 1 of poliomyelitis gave positive reactions, but in none of these cases could they exclude a previous attack of typhoid fever; 513 cases of 762 that were suspected of typhoid fever gave a positive reaction. Nine that failed to give the reaction subsequently showed typhoid fever, but from 8 of these only 1 specimen was obtained. They believe that the reaction **occurs earlier in children** than it does in adults. In several of their cases the reaction persisted for 120 days after the beginning of typhoid. In one case a child born at 7 months of a mother with typhoid fever gave a reaction for 14 days after birth.

K. Urban⁶ examined some cases that had previously had typhoid, and notes that once he obtained the **reaction 15 years after the disease**, using a dilution of 1:20. The reaction was present after 2 hours' standing with a dilution of 1:100.

C. B. Ker⁷ has made 169 tests of blood by the Widal method. One case seemingly typhus gave the reaction, and 4 which were possibly typhoid fever were negative. His other results were entirely in accord with the clinical course.

W. G. Thompson⁸ has analyzed 503 cases tested by the Widal method, of which 157 were undoubted enteric fever. The usual dilution was 1:10. In some cases dried blood was used, in some cases serum from a blister, and in some cases other methods. As a summary, he states that of cases diagnosed

¹ Phila. Med. Jour., Jan. 3, 1898.

² Lancet, Aug. 28, 1897.

³ Brit. Med. Jour., Dec. 18, 1897.

⁴ Lancet, Dec. 18, 1897.

⁵ Indépendance Méd., Nov. 10, 1897.

⁶ N. Y. Med. Jour.

⁷ Wien. med. Woch., Aug. 7, 1897.

⁸ Med. News, Oct. 30, 1897.

clinically as typhoid fever, giving positive reactions, there were 157. Of those which seemed undoubtedly typhoid fever in their clinical aspect, there were 6 which failed to react. Of those probably typhoid fever which failed to react there were 11; so that there was, he believes, 10.8% of failures. There were 20 cases diagnosed decisively as other than typhoid fever in which the test was positive. He therefore believes that the ratio of the misleading cases as compared with the genuine was 1 to 8, and he decides that the Widal test is interesting and suggestive, but **has no greater value than the diazo-reaction**, and the necessity for the aid of a bacteriologist in doing this test further interferes with its value.

W. H. Welch,¹ in **reviewing the preceding year's work** in the Widal test for typhoid fever, states that there is a general consensus of opinion as to the great value of the test. Control-examinations of non-typhoidal serum should always be made, as should repeated examinations if the first be negative. Young cultures only should be used. The dilution should be first 1:10, and, if this be positive, a dilution of 1:50 or of intermediate strengths should be tried, in order to make the result absolute. A 15-minute time-limit for the lower dilutions, and a 2-hour time-limit for dilutions from 1:50 or higher, he considers the best. The reaction appears at the beginning of the second week; an earlier appearance is exceptional and not to be expected. Usually the reaction disappears within a year after disappearance of the disease. In those who have had typhoid the reaction occurs only with the greatest rarity, and if proper dilutions and time-limits be made, all such errors can be reasonably excluded. The microscopic method is to be preferred to the macroscopic. Wyatt Johnson² reports his experience in the examination of over 600 specimens of blood, more than half of them from cases of typhoid fever. He has never found the typical reaction in any case which was not believed to be typhoid fever, and in but one case of typhoid fever was the reaction absent. He finds that the results are much better in the dried-blood method when cultures with but slight motility are used. A slightly alkaline medium likewise gives much better results. He does not recommend the dried-blood method for hospital practice, but thinks it valuable for health-board work. He has found the bacillus-coli-communis-reaction of considerable use in doubtful cases, since infection with this bacillus seems to give symptoms resembling typhoid fever. E. Dineur,³ after 55 personal observations and a study of the results of others, reaches the conclusion that the Widal reaction is a certain sign of typhoid fever when the reaction is complete after an hour in a dilution of 1:25. A negative result makes it extremely probable that typhoid fever does not exist. He has not found that other conditions give the reaction. In one case in which a purulent pleurisy caused by the typhoid bacillus occurred, the reaction disappeared in spite of the local infection.

Scholtz⁴ has investigated the **agglutinating power** of the blood of 100 cases that were not typhoid, and of 30 with typhoid. Normal blood-serum never caused agglutination, according to his experience, even in the most favorable cases, with a dilution less than 1:25, while typhoid serum will agglutinate in a dilution of 1:45. The author diagnoses typhoid if agglutination occurs with a dilution of 1:40. B. Block⁵ considers a reaction to the Widal test at a dilution of 1:40 pathognomonic of typhoid fever. He does not believe that complete cessation of motility is necessary. Patella,⁶ in his work with the

¹ Jour. Am. Med. Assoc., Aug. 14, 1897.

² N. Y. Med. Jour., July 17, 1897.

³ Bull. de l'Acad. de Méd. roy. de Belgique, Oct. 30, 1897.

⁴ Hyg. Rundschau, No. 9, 1898.

⁵ Brit. Med. Jour., Dec. 18, 1897.

⁶ Atti. e Rendiconti dell'Acad. Med.-Chir. di Perugia, vol. ix., p. 2.

Widal reaction, has been very favorably impressed with it, though he has noticed the reaction in other diseases, one of which was ulcerative endocarditis. He has not been able to determine any prognostic value of the test. In two-thirds of his cases of typhoid the reaction occurred in a dilution of 1:10 in the first week, while with this dilution not more than 2% of non-typhoid showed it, and in later stages the reaction occurred with dilutions even of 1:2000. This never happened in other diseases in his experience.

S. Délapine¹ describes his method for **health-board work** in the use of the Widal test. He obtains accurate dilution by distributing **sealed glass pipets** among practitioners. These are filled with blood by the doctor, resealed and returned, and the serum, accurately diluted, is used in the test. Of 413 examinations which he has made, there were 115 which were absolutely controlled, and whose subsequent course was found to be in accord with the serum-diagnosis. Many others were, as far as they could be followed, in accord with the bacteriologic diagnosis, and he has never obtained any positive results in a disease known to be other than typhoid fever. In a subsequent note the author states that 428 additional cases have been examined, with results that are even more favorable to the test, and he makes the striking statement that but 3% of the bacteriologic diagnoses were doubtful, while in about 50% of the cases the clinician was in doubt as to his diagnosis.

W. Johnson and D. D. McTaggart² found that **overactive cultures** will give a **pseudoreaction** with almost any serum, though in such cases the bacteria do not lose motility. Cultures in alkaline bouillon clump readily and lose their motility, and they believe that the best medium for cultures to be used in the Widal reaction is a slightly acid bouillon.

W. Johnston and H. W. Thomas³ have endeavored to make the **dry-blood method** for the Widal reaction **more accurate** by obtaining a drop of blood of definite size. They use a platinum loop to collect the blood, and subsequently use the same loop to obtain liquid for dilution.

Table of Other Results with the Widal Test.

	Typhoid.		Non-typhoid.	
	Positive.	Negative.	Positive.	Negative.
W. Reed: Nat. Med. Rev., Nov., 1897	75	1		4
E. T. Fison: Brit. Med. Jour., July 31, 1897	73	8 ⁴		56
A. Anderson: Quarterly Med. Jour.	40			
J. Colville and W. D. Donnan: Brit. Med. Jour., Oct. 16, 1897	91 ⁵	2	1 ⁶	
J. C. DaCosta: N. Y. Med. Jour., Aug. 2, 1897	95	7	4	
J. H. Musser and J. M. Swan: Jour. Am. Med. Assoc., Aug. 14, 1897	32	3		35
Levy and Gissler: Münch. med. Woch., Dec. 14, 1897	105			10
R. C. Cabot: Jour. Am. Med. Assoc., Aug. 14, 1897	97	4 ⁷	1	300
K. Urban: Wien. med. Woch., Aug. 7, 1897	6			
Gasser: Presse méd., June 26, 1897	112		2	86

A. E. Wright⁸ suggests a **new technic** for serum-diagnosis, which does not require either a microscope or living cultures. The blood is drawn in

¹ Lancet, Feb. 19, 1898. ² Brit. Med. Jour., Feb. 5, 1898. ³ Ibid. ⁴ Seen but once.

⁵ Three incomplete. ⁶ Seen but once. ⁷ Typhus fever. ⁸ Brit. Med. Jour., Feb. 5, 1898.

tubes and allowed to coagulate, and the serum is subsequently drawn into a pipet with a long capillary end. Normal salt solution is then added, making a dilution of 1:5, and 5 parts of carbolized emulsion of **dead bacteria** are added. This mixture is stood aside, and a positive reaction will be indicated by finding a mass of bacteria at the bottom of the tube after 12 hours. Antony and Ferre¹ carry out the Widal test by letting a drop of blood dry on sterilized paper, adding to this 2 drops of water and 20 drops of culture of bacilli, placing the mixture obtained in a test-tube and putting the tube in an oven at body-temperature. They examine this after five or six hours.

Fiocca,² in order to carry out the Widal test with rapidity, takes a drop of fresh typhoid culture in an *öse*, puts this on a cover-glass, and mixes a drop of blood of the same size directly with this culture. He thinks the reaction may be considered positive if all the bacteria become agglutinated within 30 minutes.

M. W. Richardson³ has compared **Elsner's method** of examining the stools in typhoid fever with the serum-reaction. He concludes that the bacilli may be isolated in the majority of cases, and that they disappear rapidly with convalescence, but may persist sometimes for weeks, thus necessitating persistent disinfection. The serum-test is simpler and gives a positive result earlier, and is therefore more valuable, though Elsner's method may be useful in some cases in which the serum-test reacts only later in the disease. He was unable to find the bacillus by this method in any case without typhoid, with the exception of one person, who was an attendant upon typhoid patients.

Jemma⁴ has obtained positive results with the use of Elsner's method of isolating the typhoid bacillus in 30 out of 33 cases of typhoid fever. In the negative cases the patients were either in relapse or in a late stage of the disease. But the serum-test gave positive results in all of the 33 cases, so that, while Elsner's method seems hopeful, the Widal test is more valuable.

R. Engel⁵ considers the subject of **prognosis** in typhoid fever, based partly upon 119 personal cases, partly upon the study of the literature. A widespread eruption indicates in a general way a severe infection. People of rather well-nourished, fatty look are very apt to have a severe course. A marked degree of initial prostration is of evil omen, though this depends chiefly upon the heart. If this is good, the outlook is always fairly good; while with a bad heart the prognosis is, of course, unfavorable. Tuberculosis influences typhoid very unfavorably, and the course of phthisis is usually hastened by an attack of typhoid. The appearance of marked delirium, particularly in alcoholics, is a very unfavorable sign. The pulse is of importance. If it reach 120, or if it is even proportionate to the fever, this constitutes an evil sign, as it should be disproportionately slow.

Treatment.—Prophylaxis.—G. V. Poore,⁶ in opening a discussion upon the prevention of typhoid fever, insisted upon careful plumbing, and spoke particularly of the danger of insuction when taps are left turned on and a vacuum is produced in the supply-pipe. An instance of the danger of this is found in the case which was described by Sir G. Buchanan, in which a water-tap on certain days yielded blood, which was found to come from a slaughter-house next door. Other similar instances were mentioned. The water-supply should be open to ready inspection as far as possible, and water-companies should be made responsible for damages. The excreta should never

¹ Bull. Méd., p. 866, 1897.

² Jour. Am. Med. Assoc., July 3, 1897.

³ Wien. med. Woch., Apr. 9, 16, 23, and 30, 1898.

⁴ H Policlínico, Nov. 27, 1897.

⁵ Münch. med. Woch., Aug. 17, 1897.

⁶ Lancet, Nov. 27, Dec. 18, 1897.

be mixed with water, but should, in Poore's belief, be spread upon the surface of well-tilled soil, where they are exposed to the air and sunshine, and are not likely to be eaten or drunk, or to be raised into dust. Under such conditions they disappear in a few weeks. In the discussion, R. Thorne mentioned that Martin had found that typhoid bacilli would grow but a few days in sterilized virgin soil, but that in soil contaminated by sewage they would grow for 200 days, and would remain quiescent during the winter and increase rapidly when warm weather returned. He did not think that Poore's suggestions could be carried out in cases of large towns. D. S. Davis gave an account of an epidemic in Clifton. The cases had been supposed to be influenza, but the Widal reaction was positive, and Davis traced the infection to a dairy. After shutting off the milk-supply from this source the epidemic ceased. Jameson showed tables to demonstrate the frequency of the disease in various countries; in Bermuda, for instance, the disease is endemic, but it increases in those places in which the dry-earth system is in use, and not in those regions where the soil is water-soaked. He believes that flies are certainly agents in the distribution of the disease, and considers it extremely important to exclude flies from kitchens, thus preventing their infecting food, especially in districts where the dry-earth system is in use.

Chantemesse¹ has prepared a toxin by using a peptone prepared from the spleen, and inoculating a culture-medium with very virulent bacilli. He has been able to immunize horses against the virulent toxin which he has made in this way, and believes that the **serum from the horse** possesses both preventive and curative properties against the intoxication as well as the infection. Guinea-pigs were saved after lethal doses of toxin if they had previously been given small quantities of this serum. In one case in which it was used on a human subject the nervous symptoms were quieted, the temperature came down, and cure ensued.

Sylvestri² has had good results in the treatment of 2 cases of typhoid fever with **serum from convalescents**. In the first case the serum was obtained from a blister, and after its use the unconscious patient became conscious and lysis soon set in. In the other case serum from the blood was injected, with the result that the nervous symptoms soon vanished, and the patient was allowed up on the twenty-fourth day, and had a rapid convalescence. V. Jez³ has treated 6 cases of typhoid fever with the serum of typhoid convalescents, and with the same serum to which equal parts of hydrogen peroxid were added. He has seen absolutely no effect in any of these cases.

F. E. Hare⁴ reports 10 years' experience in the treatment of typhoid fever at the Brisbane Hospital by the **Brand method**. His mortality in 1902 cases was 7.5%, while the mortality in a previous series of 1802 cases treated by the old methods was 14.8%. If the error for paucity of data be considered, the mortality-rate would be at the most 9.2% by the Brand method. All doubtful cases have been rigidly excluded from these statistics, and the decreased death-rate cannot be attributed to mildness of the epidemic, since there was a remarkable uniformity of results in the individual years. The mortality from perforation and hemorrhage under the two methods of treatment has, in his experience, been about equal.

H. A. Hare and C. A. Holder⁵ discuss the value of the **Brand treatment** of typhoid fever as compared with other methods, and from a study of their material and of the results of others, conclude that other methods as well as

¹ Progrès méd., Apr. 16, 1898.

² Wien. med. Woch., May 7, 1898.

³ Gaz. degli Ospedali, Feb. 27, 1898.

⁴ Practitioner, Sept., 1897.

⁵ Therap. Gaz., Mar. 15, 1898.

that of Brand have greatly lessened the mortality of the disease in recent years, and they advise that the first treatment for the fever should be sponging with ice-water when the temperature reaches 102° F. If this does not bring the temperature down in 20 minutes, the tub-bath should be used. Sponging should especially include the back of the body, where the heat is retained by the thick skin and the great muscles, since this reduces the temperature much more effectively than sponging the front of the body alone, and also prevents to some extent the formation of bedsores. Moderately active massage should be used as well as friction, as it improves the condition of the skin and aids in the reduction of the temperature. J. Tyson¹ has made estimations of the urea during the use of cold baths in a case of typhoid fever complicated with distinct nephritis and severe bronchitis. The baths did not aggravate these complications, but rather improved them. The urine was increased in amount, and the excretion of urea reached a very high point, considering the limited diet that the patient was on, since it went as high as 44.07 gm. in 24 hours.

O. Lirch² uses a **warm bath** in typhoid fever, beginning with a temperature of 95° F., gradually reduced to 90° or 85° F.; and he claims that it has all the advantages of the cold-bath treatment of the patient, and, as well, increases all the secretions, particularly the urine.

H. A. West,³ in the treatment of typhoid fever, uses water by the stomach freely, for the purpose of **cleansing the alimentary tract**. He also advises disinfecting irrigations of the large bowel when there is indication of intestinal irritation, and believes, too, that the use of purgatives is advisable.

H. G. McCormick⁴ reports **100 cases** of typhoid fever, with but one death, due to perforation of the bowel, the average duration of the illness being 22 days. There were 19 cases of hemorrhage. He is somewhat radical in his views of treatment, believing in keeping the bowels frequently moved by cathartics and intestinal lavage, using guaiacol in large doses as an intestinal antiseptic, rarely giving stimulants, and absolutely interdicting the use of any form of opium, even in hemorrhage. He controls the fever by the external use of guaiacol.

Osler,⁵ in writing of the **intestinal features** of typhoid fever, strongly condemns those methods of treatment which are based upon the view that the disease is enteric rather than systemic. He considers early free purgation harmful, and is always glad to see moderate constipation rather than diarrhea, since these cases have much less meteorism. He does not disturb the bowels in the course of the disease, excepting for marked tympanites, hemorrhage, or active diarrhea, and does not use intestinal antiseptics. For constipation he gives injections, dilutes the milk, and gives increased amounts of albumin-water. He condemns the **Woodbridge treatment**.

R. W. Holmes⁶ states that of 92 cases of typhoid fever of which he had charge, 26 were treated by the Woodbridge method. The percentage of deaths in the latter was 15.3, while the mortality in cases treated otherwise was 12.1 %, so that he concludes that the Woodbridge method does not abort typhoid fever, nor does it influence the mortality. Complications were not affected by this treatment, and in regard to those cases which have been reported in the belief that the Woodbridge method caused abortion of the disease, he says that it must be remembered that from 5 % to 8 %, cases of a mild or medium type, will of themselves get well in 2 weeks.

¹ Am. Jour. Med. Sci., Sept., 1897.

³ Jour. Am. Med. Assoc., July 3, 1897.

⁶ Phila. Med. Jour., Jan. 1, 1898.

² New Orl. M. and S. Jour., Dec., 1897.

⁴ Ibid., July 10, 1897.

⁵ Chicago Med. Recorder, Feb., 1898.

W. G. Weaver¹ discusses typhoid fever with special reference to the treatment. He devotes considerable space to the Woodbridge treatment, referring in particular to the 4 cases which Woodbridge treated in the Bellevue Hospital, N. Y., and reported in the *Medical Record*, Jan., 1897. Of these 4, 1 died, making a death-rate of 25% ; the other 3 ran the usual course and were not aborted. It is therefore proved, by the only public work ever done by the originator, that his plan neither aborts nor prevents fatal termination. The many cases said by him to have occurred in the practice of 117 physicians, without a single fatal termination, are open to suspicion from the point of diagnosis. The present author next summarizes 17 cases treated in the Wilkes-Barre City Hospital, in which the Woodbridge method was followed, with such additions as sponging, plunge-baths, whiskey, strychnin, etc. In these 17 the average duration of fever was 24 $\frac{7}{17}$ days. In 14 cases in the same institution not treated by this method, the duration was 17 days on the average. There does not seem to be a remarkable tendency to premature abortion of the attack in the cases treated by the Woodbridge method. [We do not believe this plan of treatment merits the attention it has been given, and, as Osler well states in an article on this subject, there is no more reason why one should use this treatment than there is for employing Bishop Berkeley's tar-water. The testimonials in either case have been most flattering, and bear a very suspicious resemblance. History repeats itself, and fads and fashions rise and fall.] J. E. Woodbridge² gives the statistics of 6911 cases of typhoid fever, collected from various practitioners, which were treated by his method. The mortality which he claims is only 1.91%.

J. N. Upshur³ highly commends **turpentine** for tympanites in typhoid fever; in the same condition with great depression he uses large doses of opium. He believes that the remarkably brilliant results claimed for Woodbridge's treatment disprove the claims.

O. F. Paget⁴ reports a series of 100 cases of typhoid fever without any deaths, in which the treatment consisted chiefly of enormous doses of **salad oil**, sometimes as much as a pint. This, he believes, acted as a sedative to the inflamed bowel and was also a protective to the ulcers.

R. C. Thacker⁵ gives some details of 23 cases of typhoid fever treated with **carbolic acid**. Of these, 1 died, and hemorrhage occurred in 8 cases, but was controlled. He believes that this treatment favorably modifies the duration and height of the fever as well as the general condition of the patient.

Arnaudet⁶ gives **silver nitrate** as an intestinal antiseptic in typhoid fever. In 36 cases there were but 3 deaths.

R. W. Erwin⁷ has been able to control **epistaxis** in typhoid fever by compression of the anterior portion of the nasal septum. He has found that the bleeding usually comes from this point.

F. C. Shattuck,⁸ in **dieting** typhoid patients, admits of much more variety than ordinary teaching allows, making the diet consist largely of milk or preparations from milk, such as buttermilk, koumyss, whey, etc., but also allowing carefully strained meat- and vegetable-soups, artificial food-preparations, strained gruels, ice-cream, soft-boiled eggs, and scraped meats, as well as other semi-solid, readily digested foods. Under such diet his mortality in hospital cases in the past five years has decreased nearly 2%, and he believes

¹ Penna. Med. Jour., Jan., 1898.

² Ibid., July 3, 1897.

³ Indian Med. Rec., July 1, 1897.

⁴ Med. Rec., Dec. 27, 1897.

⁵ Jour. Am. Med. Assoc., July 10, 1897.

⁶ Lancet, Nov. 27, 1897.

⁷ Gaillard's Med. Jour., lxxviii., p. 169.

⁸ Jour. Am. Med. Assoc., July 10, 1897.

that this enlarged diet is certainly not injurious. W. Warren,¹ in the dietetic treatment of typhoid fever, usually prefers a milk-diet, though when there is good digestion he uses soups and strained vegetables, limiting farinaceous foods in all cases, however, except when partially pre-digested.

Infections Resembling Typhoid Fever.—H. I. Raymond² reports a number of cases of **mountain-fever**, and presents a study of them, showing quite convincingly that they are really typhoid fever. They differ from the latter chiefly in the profuseness of the eruption, the variable character of the stool, the irregularity of the temperature, and in the absence of fatalities among the white patients. Indians frequently had purpura, and among them the mortality reached 18.6%. The proof that the disease was infectious was fairly well furnished by the fact that it entirely disappeared after the water was boiled.

N. E. Brill³ has studied 17 cases of fever which resembled typhoid fever, but which gave no reaction to the Widal test. The cases usually began with malaise, anorexia, weakness, and pains, and often with distinct chills, and there was a quite rapid rise of temperature. The general appearance then became very much that of typhoid fever, the spleen enlarged, the pulse became dicrotic, and the temperature continued elevated for 10 or 12 days, when it fell. There was no leukocytosis; malarial parasites were absent. In some cases rose-spots appeared, but these usually did not appear in crops. The typhoid bacillus was not discovered in any of these cases. Brill believes that the cases were not typhoid fever, and feels that he must consider them intestinal toxemia.

N. B. Gwyn⁴ records a case in which the usual features of typhoid fever, with the exception of the Widal reaction, were present. Cultures from the blood showed a bacillus resembling that of Eberth, but which produced no indol. It agglutinated with the patient's serum, while typhoid serum had no effect upon it. Gwyn considers this a **paracolon** variety of **bacillus**, and thinks it the cause of the disease in the case reported, believing that it occupies a position midway between the typhoid bacillus and the colon-bacillus.

MALTA FEVER.

R. Kretz⁵ records the case of a physician who had contracted an obstinate fever in Ajaccio. This had continued for six months, and typhoid fever and malaria had been entirely excluded. After his recovery the **diagnosis** of Malta fever was made by finding that the blood-serum caused **agglutination** of the *Micrococcus Melitensis* in the proportion of 1 to 300. A. R. Aldridge⁶ has studied the serum-reaction of Mediterranean fever, and the treatment of this disease by **antitoxic serum**. In every case of typical Malta fever he obtained the serum-reaction; in one case the reaction was found on the fifth day. The dilutions successfully used were from 1 to 10 up to 1 to 100. Five cases were treated with the antitoxic serum of Wright; 2 cases were unaffected, while 1 severe case improved almost at once, and 2 very recent cases, which were not very severe and were uncomplicated, showed rapid improvement.

INFLUENZA.

G. Gresswell,⁷ in his observations on influenza, has found that healthy people are more apt to be infected than those who have been previously in bad

¹ Physician and Surgeon, Jan., 1898.

² Am. Jour. Med. Sci., Mar., 1898.

³ N. Y. Med. Jour., Jan. 8 and 15, 1898.

⁴ Bull. Johns Hopkins Hosp., Mar., 1898.

⁵ Wien. klin. Woch., Dec. 9, 1897.

⁶ Lancet, May 21, 1898.

⁷ Ibid., Sept. 18, 1897.

health. He insists upon the **contagiousness** of the disease. In referring to the manifestations of the onset, he mentions a case that appeared to have an apoplexy, but soon recovered. Another peculiar onset occurred in a young man, who appeared dazed and without power of movement. In some cases he has seen almost continuous sleep for several days. [A soporose condition has been very pronounced in a large number of the cases under our observation.] Marquie¹ has observed 7 cases of influenza which were peculiar in the occurrence of extremely **free sweating** and a tendency to increase of adipose tissue. The sweats continued for months, and left the patients neurasthenic. Sometimes sweats alternated with bronchial disturbances. W. S. Young,² noting carefully all of his influenza-patients in a recent epidemic, was unable to discover more than one case of **jaundice**. This observation differed from those in previous epidemics. Pelon³ observed 3 cases of grip with rose-spots and other **symptoms of typhoid fever**. The diagnosis of typhoid fever seemed established, until it was found that in all 3 cases the Widal test was absolutely negative, and the temperature soon fell rapidly, all the symptoms improved, and the patients became entirely well. Kretz⁴ states that he has discovered influenza-bacilli in the sputum even many months after the attack has passed off as well as when symptoms have been left behind, and thinks it possible that some of the sequelæ may be due to the persistence of the germs.

H. C. Turney,⁵ after studying the occurrence of **relapses** in influenza, concludes that certainly 10% of cases relapse. If there is any immunity conferred, it is so short as to be unimportant; a first attack seems after a time to predispose to a second. Feinberg⁶ reports two instances of **nervous complications** of influenza. In the one there was neuritis of the brachial plexus, which caused severe pain and loss of power of movement in the right arm and shoulder, followed by wasting and diminution of the electric reactions. The second case resembled hemorrhagic encephalitis. There was sudden delirium with unconsciousness, trismus, rigidity, and continued delirium, but entire recovery was finally attained, except for weakness of the right arm. Maragliano⁷ emphasizes the tendency that the pyogenic micrococci exhibit in grip to locate themselves at once wherever there is favorable soil, causing perhaps a pleurisy which is purulent from the beginning, or other similar manifestations.

Treatment.—Goliner⁸ reports successful results from the use of **phesin** and **cosaprin** as antipyretics in influenza, and states that the headaches and other pains were at the same time greatly relieved, and that the drug had no depressing effects. Bresler⁹ has used **kryofin** in influenza, and prefers it to the usual antipyretics, such as antipyrin and phenacetin. It should be given to prevent rise of temperature, rather than to bring it down when it has already risen. The general condition was improved by the use of this drug. It frequently caused sweating. One woman showed marked cyanosis after a dose of 15 gr. [Drugs of the character referred to in the last two abstracts must be used with care, and laudatory notices of their advantages should be received with reservation.] S. V. Haas and J. B. Morrison¹⁰ conclude, after their use of kryofin in 150 cases, that it is safer than other similar preparations, and, while less rapid in its effects, is a useful analgesic and hypnotic

¹ Jour. de Méd. de Bordeaux, Feb. 6, 1898.

² Quatrième Congrès Franç. de Méd. int., 1898.

³ Lancet, Feb. 5, 1898.

⁴ Gaz. degli Osped. e delle Clin., Jan. 23, 1898.

⁵ Therap. Monatsh., Oct., 1897.

⁶ Brit. Med. Jour., July 10, 1897.

⁷ Wien. klin. Woch., No. 40, 1898.

⁸ Neurol. Centralbl., July, 1897.

⁹ Aerzt. Rundschau, vol. 8, p. 241.

¹⁰ N. Y. Med. Jour., Mar. 26, 1898.

when pain is not severe. They note 2 cases, however, in which collapse of some gravity followed its administration. G. Freudenthal¹ has attempted an **abortive treatment** of influenza in 32 cases by giving calomel in a dose of 1½ gr., which was repeated. The symptoms were, in his experience, much decreased and nearly relieved in from 6 to 10 hours, and this he believes was due to a change from the mild chlorid into the corrosive chlorid.

MALARIAL FEVER.

Etiology.—R. R. H. Moore² states that in temperate climates malaria is always dependent upon the presence of **marshes**, while in tropical climates marshes have no such relation. The relation between marshes and malaria diminishes as the tropics are approached. In tropical regions the fever-season is the season of rain; in other climates this relation is not observed. Moore believes that there is no evidence to show that malarial fever is ever caused by breaking up the soil or by the drinking-water. [It is not improbable that in the tropics the necessary conditions for the development of the germs of malaria are supplied during the wet seasons, and that in temperate climates the existence of marshes supplies similar conditions. It has certainly seemed established in this country that excavations cause outbreaks of malaria where the disease had become uncommon.] H. J. Waring³ has studied the relation of the **water-level** to malaria, and finds that malaria is most prevalent when the water-level is highest. This is due, he thinks, to the parasite being driven up into the atmosphere by the rising water, and he believes that the disease is carried through the atmosphere rather than through water. He thinks that malaria can be fairly well controlled by using water from places in which the water-level varies but little. W. R. Brooksher⁴ records the fact that in a certain district in Arkansas, where malaria is frequent, there were several families living near each other and under identical conditions, excepting that their **water-supply** was different. Some of these families contracted malaria, some did not; as, for instance, one family with a 75-foot well never had malaria, while some members of a family near by, whose well was but 25 feet deep, nearly always had malaria. H. J. Dupuy, Jr.,⁵ records a number of instances in which people in a malarial district escaped the disease, apparently by boiling the drinking-water. In several of the instances, people in the immediate neighborhood who did not boil their water were constantly subject to malaria, and Dupuy further states that in the neighborhood of New Iberia, in Louisiana, malaria has largely disappeared since the people have become generally accustomed to using cistern-water instead of surface-water. J. M. Batten,⁶ in contradiction of the theory that malaria is a water-borne disease, states that while serving in the navy during the civil war, he noted that the crew of the vessel upon which he was serving were constantly attacked with malaria when in an infected district, although all drinking-water was boiled. Pulvirenti⁷ states that he has been able to prove that malaria arises in all places where organic material is decomposing, and he claims that the infection may remain active for as long as 24 years in infected soil and the like. Coronado⁸ mentions a number of instances which tend to prove the **contagiousness of malaria**. For instance, sailors on a coast-vessel running to Havana had never been affected with malaria until cases of malarial fever

¹ Therap. Monatsh., Heft 10, p. 524, 1897.

² Lancet, Mar. 12, 1898.

³ Ibid., Sept., 1897.

⁴ Gaz. degli Osped., Oct. 3, 1897.

⁵ Indian Med. Gaz., Jan., 1898.

⁶ New Orl. M. and S. Jour., Nov., 1897.

⁷ Jour. Am. Med. Assoc., Aug. 14, 1897.

⁸ Rivista de Anat. Pat. y. Clinica, Jan. 15, 1898.

came aboard, and after this they acquired the disease. Other cases are mentioned, such as malarial individuals coming into districts where the disease had been almost unknown, after which others were taken down with the affection. He has, he believes, observed the development and growth of the plasmodium outside the body, so that there is, in case this is true, very evident opportunity for infection. [The statements of the author are somewhat surprising and will bear confirmation.]

The Plasmodium.—R. Ross,¹ in his observation on the transformation of malarial crescents into spheres and flagellate bodies, states that this occurs in the mosquito's stomach, in ordinary blood-preparations, and in the leech. He concludes that any change in the density of the medium may cause it, and thinks that the crescent has a sheath which it casts off when the density changes. He considers this change in the crescent a vital phenomenon, and not a degeneration. Ross² also records his discovery of peculiar brownish pigment, in the shape of fine needles, in the epithelial cells of the stomach in two of six mosquitoes that had been fed upon blood which contained malarial crescents. The pigment was arranged around the nucleus, and he considers that it was malarial pigment. Numerous other observers confirmed these results. P. Manson³ gives a review of Surgeon-Major Ross's work during the past year in Calcutta. In these experiments he fed mosquitoes upon birds infected with **proteosoma**, and discovered afterward that in certain mosquitoes there were found pigmented cells in the wall of the stomach. These cells were not found in mosquitoes fed on healthy men or on those whose blood contained crescentic plasmodia, nor were they found in mosquitoes fed on healthy birds or birds infected with *halteridium*. They increased rapidly in size, and probably belonged to the coccidia. They seem to present a stage in the life-history of the proteosoma while it is living a parasitic existence in the mosquito. F. P. Solly⁴ found three forms of flagellate bodies in a case of tertian malarial fever. The first was extracellular and pigmented and had flagella. The pigment was almost motionless, but when the flagellar motion became active the pigment became distributed throughout the cell and went into active motion. In the second form the pigment was very active, but there were no flagella; suddenly, with the cessation of the vibrations of the pigment, a single flagellum appeared and the pigment flowed into it, but subsequently returned to the cell and the flagellum went into active motion; this finally became slower and the flagellum was absorbed into the cell. In the third case there was an odd, intermittent movement in the pigment-granules, then among the surrounding red cells, then two flagella appeared, and these became detached and vanished, and the nuclei of the cell also disappeared. Solly directs attention to the similarity between his observations and those of McCallum, and believes with him that this is a form of sexual genesis. R. S. Woodson,⁵ in examining the blood from a case of malaria, saw a round hyaline body, one-fifth the size of a red corpuscle, move across the field, attach itself to a red blood-corpuscle, enter the same, and move about in its protoplasm by ameboid changes in its shape. It also altered its outline and increased in size. D. C. Rees⁶ records his observation of the change of crescents into spheres, and subsequently to flagellate bodies and degenerated spheres. The latter are somewhat smaller than ordinary spheres and contain a large amount of pigment. Another sphere-like form which he observed was really a disc, and the shape seemed to be assumed from mechanical pressure in the preparation of the

¹ Indian Med. Gaz., Jan., 1898.

² Ibid., June 18, 1898.

³ Jour. Am. Med. Assoc., Aug. 7, 1897.

⁴ Brit. Med. Jour., Dec. 18, 1897.

⁵ Med. News, Apr. 16, 1898.

⁶ Brit. Med. Jour., Feb. 19, 1898.

spreads. He has never seen true spores. K. Däubler¹ describes the malarial parasites which he found in 34 cases that had come from the tropics with chronic malaria. About one-half of these cases showed only a cachexia, while the others had acute or subacute forms of pernicious malaria. In 14 cases he found only small non-pigmented parasites in the form of rings. In the others there were round motile masses, which contained a dark granule in the center or had a dark border, and were usually intracorpuseular forms. The larger forms were not found. As a result of his work, he concludes that only two varieties of the parasites are found in the East Indian forms of malaria; the smaller variety, which occurs in the immature state in the peripheral blood, and a moderate-sized variety with fine pigment, which is found in the course of the tertian and quartan forms of the disease. These varieties may occur together, and may cause remittent or quotidian malaria. The small variety appears rather as a disc than as a ring. H. Ziemann² records his studies of the malarial parasite in Italy, and finds that the young parasite is composed of protoplasm containing a mass of chromatin surrounded by an achromatic zone. During growth the chromatin increases, and when the parasite divides the chromatin, after proliferation, also divides and forms into individuals like the primary one. The author believes that the tertian and quartan forms are distinct, and considers the oval bodies and crescents the result of degeneration. He found transitional stages between these latter forms and the small parasite in the bone-marrow and spleen. Methylene-blue and phenocol hydrochlorate had no apparent effect upon the parasites, while quinin did, acting first upon the protoplasm, and subsequently upon the chromatin. Its effect was less marked while the parasite was dividing. Ziemann has never been able to find the parasite outside the human body. C. W. Duggan,³ in his examination of blood from malarial patients on the west coast of Africa, found always pigmented intracellular parasites, all having a ring-form and possessing no process. The parasite resembled in most points that described as common in the estivo-autumnal form of malaria in Southern Italy.

Symptomatology.—W. B. French⁴ has studied malarial fevers as they occur in the District of Columbia. He considers it probable that the water-supply is responsible for the malaria. In the blood-examination he has repeatedly noticed phagocytosis. In one instance he found the estivo-autumnal form of parasite after 50 gr. of quinin had been taken within 36 hours, and 20 gr. had been taken daily for several previous days. He has found, in all, 41 cases of tertian and 50 cases of estivo-autumnal infection, while there were 3 of combined infection. Seventy white and 24 colored people were diseased. There were 2 cases of pulmonary tuberculosis complicated by malaria. In the discussion, Reed stated that it is his belief, and he thinks it is the general experience, that the negro is more resistant to malaria than the white races, and this he supports by his observations over a period of 4 years, in which time the number of cases per thousand in negroes was in each year considerably less than half of those that occurred in the whites. Reyburn opposed this view on the basis of a collected series of nearly 500,000 cases of malarial fever. He found that a large proportion of colored people were infected with the disease.

B. Robertson⁵ discusses malaria from the standpoint of the clinician. He observed that, as a rule, the intermittent forms occurring about New York City are easily diagnosed. Still, occasional cases of supposed intermittent fever turn

¹ Berlin. klin. Woch., Jan. 31, Feb. 7, 1898.

² Deutsch. med. Woch., Feb. 24, 1898.

³ Brit. Med. Jour., June 15, 1898.

⁴ Nat. Med. Rev., Nov., 1897.

⁵ Med. Rec., Jan. 15, 1898.

out in the end to be gall-stone, tuberculosis, or typhoid fever. The examination of the blood is not absolutely reliable, as the organisms of malaria occasionally occur in such small numbers that they are overlooked. Speaking of the treatment, and particularly of the value of quinin, he notes that there is a widespread conviction in the profession that quinin must cure malarial fever, but he himself has time and again given large doses by the mouth and rectum and seen the fever continue. In such instances Huxham's tincture in teaspoonful doses sometimes proved active. The author concludes with disapproval of the statement of a recent writer, that "the physician who cannot cure malaria with quinin should abandon the practice of medicine." He alludes to some of the conditions which make the administration of quinin difficult or impossible, and also to certain other cases in which he felt sure that the disease was malaria, and in which quinin did not prove effective. [We cannot but agree with the author in both of the points to which he calls particular attention—viz., that there are cases in which it may be very difficult to demonstrate any plasmodia in the blood, and that there are cases in which quinin does not prove effective in the treatment. Nevertheless such cases are exceedingly rare, and do not relieve us from the necessity of carefully searching for the parasite in the blood before making a diagnosis and from looking with suspicion upon supposed malaria not relieved by quinin.] E. Craster¹ has regularly noticed in cases of chronic malaria in the Niger territory a **rose-pink discoloration** of the skin over the thenar and hypothenar eminences and at the base of the phalanges on the palms of the hands. This discoloration increases until it is often a brilliant red. A. S. Warthin² records 2 cases of malaria which were interesting because they had not been in malarial regions for a long time; one had removed 3 months and the other 8 months before the attacks. [Cases of much greater duration of latency have been recorded.]

Hemorrhagic Forms.—Bastianelli,³ in discussing malarial **hemoglobinuria**, states that it is rare in Italy, while common in Sicily and Greece. Following quinin, it is especially rare in Italy. The spontaneous form he divides into those attacks that occur during the paroxysm, those that occur after the paroxysm, and those without any other evidence of malarial infection than post-mortem discovery of the perivascular melanosis. An anemic condition of the blood seems to be essential to the production of the hemoglobinuria. It does not occur in the early paroxysms of malaria, except with the utmost rarity, nor does it occur in very chronic cases in which the equilibrium of the system has been established. Hemoglobinuria from the use of quinin occurs only in persons who have had malaria; when quinin is administered either during the attack of malaria or after it, small doses of the drug may bring it on. Even if hemoglobinuria occurs during a malarial paroxysm, quinin should be given, unless parasites are absent. In the latter case there has been already a sufficient amount of the drug administered. If parasites are still found after the administration of the quinin, even if hemoglobinuria appears, the drug should be continued. R. L. Denman⁴ has seen 19 cases of malarial "hematuria" in 3 years. All the cases began with initial chill and pernicious symptoms. No case occurred after the use of quinin, and, in his belief, all occurred because quinin had not been previously used. In all cases there had been previous chills, and there was malarial cachexia. In none of the cases had the condition of the urine any evident association with the hyperpyrexia. Quinin seems to him to arrest these attacks, unless there are uremic symptoms, in which case he does not give the drug, but depends upon strychnin and nitro-

¹ *Lancet*, Sept. 4, 1897.

² *Annali di Medicina*, anno ii., fasc. xi.

³ *Med. News*, Mar. 5, 1898.

⁴ *Texas Med. Jour.*, Apr., 1898.

glycerin. If there are no symptoms of uremia, quinin is absolutely indicated. W. Krauss¹ has made a study of the reports sent him of nearly 100 cases of malarial "hematuria." The clinical histories corresponded to those typical of this affection in most cases. In only 3 cases were plasmodia found, and all these had quotidian paroxysms and very mild hematuria. In one fatal case hematozoa were found. One hundred and fifty specimens of urine were examined. The specific gravity was found high, the urea greatly increased, and the acidity diminished. Methemoglobin, hematin, and hematoïdin were found. Nucleo-albumin, serum-albumin, and globulin were often found, but usually in small amounts. If the albumin were present in large amounts, there were usually casts also, and such cases were commonly fatal. There was one autopsy without notable lesions. There was nephritis, with marked anemia of the kidneys and liver, and congestion of the spleen. The liver showed the greatest change, which consisted of distention of the capillaries with pigment-masses contained in necrotic cells. The hepatic cells showed cloudy swelling. W. R. Livingston² reports 2 cases of **hemorrhagic pernicious** malarial fever. In the first, blood escaped with the vomit, the urine, and the stools. The man was comatose; 60 gr. of quinin were given hypodermically, and recovery ensued. Fifty gr. of quinin given hypodermically caused recovery in the second case, in which there were coexistent hemorrhages from the stomach, bowels, kidneys, nose, and conjunctivæ, and large skin-ecchymoses. C. A. Dukes³ reports 4 cases which had fever with severe prostration, all having sudden onset, passing into coma, and dying. One of the cases vomited blood; all had severe vomiting. There was some question as to whether they were yellow fever, since all had been in Panama, but Dukes believes they were **pernicious malaria**. Norton⁴ has studied the possible **complications** and **sequelæ** of malaria. Complications are certainly rare, and Norton believes that there is no ground for considering scorbutic or hemophilic conditions ever the result of malaria, and he believes that it does not cause dropsy unless in cases of profound cachexia. Hemoglobinuria is much less frequent than is commonly believed, though it certainly has occurred. Pneumonia may occur with the disease, but not because it is due to it. Among the frequent complications are those of the gastrointestinal tract, particularly acute gastroenteritis and choleraic attacks. Probably sclerosis of the liver occurs also. The most common and dangerous complications are those of the central nervous system, such as coma, delirium, convulsions, sometimes conditions resembling meningitis, and even hemiplegia; and in some cases there are signs of bulbar disease, and degenerations may be found in the medulla. Neuritis is at least rare, and very possibly never due to malaria. Norton concludes by stating that the collateral affections really due to malaria are comparatively few, and that the disease has been accused of more than it has ever caused. G. Dock⁵ records the case of a pregnant woman with malaria to whom 40 gr. of quinin were given. **Abortion** followed, but not until 3 days had passed, so that it seemed impossible that the quinin had caused it. He attributes the abortion to the malaria. Plasmodia were looked for in the blood of the fetus, but were not found. Naamé⁶ reports, as due to a hepatic reflex in a malarial subject, marked irregularity of the pulse with **dilatation of the heart**. The condition disappeared entirely under treatment for malaria, which the patient undoubtedly had. He considers the case analogous to the reflex symp-

¹ Southern Med. Pract., Sept., 1897.

² Pacific Med. Jour., Aug., 1897.

³ Phila. Med. Jour., Apr. 16, 1898.

⁴ N. Y. Med. Jour., July 17, 1897.

⁵ Am. Jour. Med. Sci., Feb. 18, 1898.

⁶ Rev. de Méd., May 10, 1898.

toms which occur in biliary lithiasis. O. Nagel¹ has observed 300 cases of the affection termed **climatic bubo**, and since he has found but 2 of these cases associated with malaria, he decides, contrary to the views of others, that the affection is not a local manifestation of malaria.

Treatment.—M. C. Nanjunda Row² writes that he has for years been in the habit of treating the severe cases of malaria which he sees in India by giving moderate doses of quinin immediately after the paroxysm, when the organisms are supposed to be in their weakest condition. He states that he has never seen a case which would not respond to this method of administration of quinin. The drug should be continued for some days after the paroxysm. J. G. Van Marter, Jr.,³ contends that quinin is a specific for the simple intermittent or remittent forms of malaria only, and has no specific action in the chronic forms of the disease which are associated with no fever or with a continuous fever. He does not believe that quinin ever prevents a recurrence of hemoglobinuria. In his experience severe toxemias have never responded to quinin when there was no change of location. [Doubtless many of the conditions termed chronic malaria are diseased states resulting from disorders initiated by malaria, though the malaria itself has subsided. In such cases a specific such as quinin would probably prove of little advantage, as clinical experience has shown.] J. H. Sears⁴ has found that hemorrhages are apt to follow the administration of quinin in malaria when the action of the kidneys was partially or completely suppressed. D. W. Montgomery⁵ records a case in which the administration of quinin caused **purpuric hemorrhage** in an adult male who had never shown any previous tendency to such hemorrhages. K. Dunham⁶ finds the hydrochlorosulphate of quinin is, for hypodermic use, the most effective and least painful preparation.

St. G. Gray⁷ has had useful results from **euchinin** in malarial fever. It is valuable because it is tasteless and can be readily administered to children. He finds that it does cause cinchonism, but believes that it is necessary to use but half the dose that one would use of quinin. J. Mannaberg⁸ has investigated the action of hydrochlorate of **phenylchinaldin**, **methylphosphin**, and hydrochlorate of **dimethylphosphin** in malaria, since these drugs are poisonous to infusoria and ameba. Four cases of malaria were treated, 2 double tertians and 2 simple tertians. The attacks were controlled for a few days, but soon returned after stopping the drugs, and the parasites did not disappear from the blood at any time during the administration of the drugs. Solutions of methylphosphin of 1:10,000 had no effect upon the parasites, while 1:5000 caused the movements to cease. Mannaberg believes that the effect of these drugs was only to postpone sporulation. V. Dall'Olio⁹ recommends the **hydrochlorate of phenocol** as an antipyretic, analgesic, and antirheumatic. He has found it particularly valuable in chronic and even inveterate malaria, and also in chorea and whooping-cough. It is well taken by children. F. Mays¹⁰ finds that **methylene-blue** is extremely active and valuable in those cases of malaria which are resistant to quinin; these being usually the quotidian cases. He records a series of cases which had received no benefit from quinin, but which showed rapid improvement under the use of methylene-blue. He finds that this substance is less irritating to the stomach

¹ Münch. med. Woch., Mar. 22, 1898.

² Va. Med. Semi-monthly, Jan. 28, 1898.

³ Boston M. and S. Jour., Dec. 23, 1897.

⁴ Brit. Med. Jour., Feb. 26, 1898.

⁵ Gaz. Medica Lombarda, p. 34, 1898.

⁶ N. Y. Med. Jour., Jan. 15, 1898.

⁷ Charlotte Med. Jour., Nov., 1897.

⁸ Va. Med. Semi-monthly, Apr. 15, 1898.

⁹ Deutsch. Arch. f. klin. Med., Oct., 1897.

¹⁰ Münch. med. Woch., June 14, 1898.

than quinin, if a pure preparation is used. Cardamates¹ has had very favorable results from the use of methylene-blue in intermittent fever. He believes that it is indicated only when quinin is contraindicated, being valuable in cases of hemoglobinuria, or in pregnancy when abortion is feared. It causes no unpleasant results, but occasionally a slight cystitis. Mikhailoff² found from his experiments on frogs and rabbits that the leukocytes were not colored blue after the administration of methylene-blue, except in rare instances just before death, so that he concludes that healthy living protoplasm is not colored by this dye. Animals which had been given methylene-blue for three weeks and died were found to have the liquids in their body-cavities colored blue. The organs also were colored blue and contained methemoglobin. The parenchyma of the organs was degenerated and thrombosis had occurred; hence Mikhailoff believes that the drug should not be used in man. Perona³ administers **hypodermic injections** of a solution of **iodin**, potassium iodid, and guaiac in pure glycerin for the cure of malarial hypertrophy of the spleen, and claims good results.

KALA-AZAR.

L. Rogers,⁴ after investigating the epidemic fever of Assam which is called Kala-azar, finds that the fever is definitely intermittent or remittent, is accompanied by progressive anemia, wasting, and enlargement of the spleen and liver, and sometimes dropsy appears toward the end. Ninety-six per cent. died from fever, exhaustion, or complications. In Rogers's belief the disease corresponds clinically to chronic malaria. He states that it also shows the post-mortem lesions of this disease, and that the plasmodium was found in various stages of the fever during life. Thornhill thought that the disease, while malarial in nature, might be spread by the ankylostomum, since this parasite is so frequently found in these cases. G. Giles⁵ states that he has made an extensive study of Kala-azar, and has reached the conclusion that it is due to ankylostomiasis occurring in a population that has for a long time been subject to chronic malarial poisoning. Against the criticisms of Rogers, that the worms are not always found at autopsy, Giles states that this is due to digestion of the parasite, the chitinous envelope of which he has often found in the intestine in such cases. In malarial anemia the sclerotic is usually yellow, while in Kala-azar it is white, as it is in ankylostomiasis. He advances other strong arguments in favor of his contention.

LEVANT FEVER.

A. A. Smith⁶ reports a case of **Levant fever**, the first, he states, that has been recorded in this country. The patient lived in the United States until 1885, when she went to Syria. She several times suffered from fever in her new home until 1895. She then returned to America and became run down. Upon returning to Syria she had a severe attack of typhoid fever, with hemorrhages. Convalescence was rapid, but was followed by remittent fever, which had continued 10 months at the time of the author's report. Not finding relief at home or in Switzerland, she returned to America. During the spring of 1897, when she was in New York, the fever was intermittent, the attacks lasting a few hours, beginning at 2 p. m. and passing off about 6 p. m. She had had almost constant night-sweats from October, 1896; appetite remained fairly good, but

¹ Bull. Méd., p. 351, 1897.

² Sem. méd., Feb. 9, 1898.

³ Indian Med. Gaz., Jan., 1898.

⁴ Gaz. hebdom. de Méd. et de Chir., Aug. 6, 1898.

⁵ Brit. Med. Jour., Mar. 26, 1898.

⁶ Am. Jour. Med. Sci., Dec., 1897.

she had lost considerable weight. Examination of the blood showed very moderate anemia with slight leukocytosis (maximum, 20,200). There were found in the blood **hyaline organisms** occupying the red corpuscles, and in a few instances in the act of extrusion. These were ameboid, but less actively so than the ordinary malarial parasites. No pigment-forms were observed. They were considerably larger than the ordinary intercellular hyaline forms of malarial plasmodia. It was noted that the bodies referred to were probably not artefacts, from the fact that the surrounding corpuscles were normal. Stained with eosin and methylene-blue, the parasites behaved like malarial organisms. These bodies differed from malarial parasites in the time of their occurrence, being most abundant in the younger stages at the height of the fever; in the absence of pigment; in the slower ameboid movements, and in the shorter cycle of development. The absence of segmentation-forms was also striking. Observers in the Levant regard this disease as malaria, but the author points out distinctions from malaria. Among these, the resistance to quinin, the absence of degenerations of the red corpuscles, the absence of enlargement of the spleen, and the fact that there is no pigment in the blood-corpuscles, are important. [It is impossible to determine from the report as to the exact nature of the supposed organisms. The complete absence of pigmentation and the preservation of the integrity of the red corpuscles are certainly singular at least. Malaria does not seem to be sufficiently excluded.]

YELLOW FEVER.

J. Sanarelli¹ contributes a second paper relating to the effects of injection of the **toxins** of the **Bacillus icteroides**. Guinea-pigs and rabbits were poor subjects for study, while dogs presented the same symptoms that they did after the use of the virus. Horses were, as a rule, more resistant, but certain varieties were extremely sensitive. The goat was very sensitive, and presented severe renal lesions. From these results he concludes that yellow fever is eminently a toxic disease, induced by a poison generated by the *Bacillus icteroides*, which poison he calls *amaril*. When the *Bacillus icteroides* and streptococci, or even more markedly *Staphylococci aureus*, were placed in culture-media, the cocci always grew even better than in their pure cultures, while the *Bacillus icteroides* could not be grown in cultures. This explains the negative results often obtained in searching for the *Bacillus icteroides* in the cadaver, and demonstrates the opportunity for secondary infection in yellow fever. The *Bacillus icteroides* proved to have little resistance to moist heat, but resisted dry heat at 100° C. for 1 hour and 10 minutes, and required a temperature between 120° and 125° C. to kill it. It strongly resisted desiccation. Direct sunlight seemed to cause its death in about 7 hours. It retained its vitality in sea-water for a remarkable length of time. The persistence of yellow fever on board of ships seems to be due to a combination there of humidity, heat, darkness, and want of air, together with the fact that mould aids the growth of the bacillus, as was evidenced by the fact that it grew luxuriantly when mould was added to the cultures. The influence of humidity was seen also at Montevideo in 1872, when those who lived in damp houses facing the north were especially subject to infection. The evidence of infection through the digestive tract is insufficiently proved, and Sanarelli has shown that animals may be infected through the respiratory tract, so that this may be the path of infection; but individuals acquiring yellow fever usually have a preceding disturbance of digestion, which suggests that the alimentary tract may

¹ Ann. de l'Inst. Pasteur, Sept. 25, 1897.

serve as a point of entry for the bacillus. G. M. Sternberg¹ believes that he should be accorded his due share of credit in discovering the *Bacillus x*, if this be proved identical with Sanarelli's bacillus. He also directs attention to his previous suggestion, in his report on yellow fever, that this disease is due to absorption of toxins. He states that *Bacillus x* was motile in his original cultures, although Reed has found it non-motile in his present cultures. [Certainly Sternberg's original descriptions do not apply to the bacillus of Sanarelli, and he expressly stated that he did not regard the *Bacillus x* as the cause of yellow fever. It is hardly probable that he will be accorded any share in the honor of the final discovery.] C. B. Fitzpatrick,² in investigating several cases of yellow fever, found, besides Sanarelli's bacillus, two other bacilli, which he terms the *Bacillus coli icteroides* and the *Bacillus coli concentricus*, and he finds that the use of attenuated cultures of any of these bacilli will produce immunity to lethal doses of pure cultures, and that if these bacilli be mixed, either two or three together, the injection of attenuations of such mixed cultures will also produce immunity to the virulent mixed cultures. He is led to believe that if these organisms cause yellow fever, a serum can be produced that will immunize against this disease. S. E. Chaillé³ expresses his conviction that yellow fever is **not a directly contagious disease**, and that his experience and the experience of others have led him to believe that, if careful quarantine measures be carried out, the disease may be entirely limited and prevented from spreading, even to attendants or others exposed to the sick. He thinks that the Government should carefully guard against interfering with individual rights any more than is absolutely necessary, and should promptly pay for any damage caused in carrying out quarantine measures. H. M. Folks⁴ states that yellow fever may be prevented from spreading, even in a crowded hotel, by placing a double thickness of mosquito-netting or other light material over the windows, having it kept moist with 1:500 bichlorid-solution, and at the same time taking very great care that neither the patient's clothing, any of the objects in the room, nor anything that comes in contact with the nurse or the doctor, is allowed to be touched by other people until it has been thoroughly disinfected with 1:500 bichlorid-solution. A. N. Bell⁵ also presents a number of observations in his personal experience to prove that yellow fever is not a directly contagious disease, and that people not immune may, without danger of acquiring the disease, come in contact with those who are suffering from the affection, if the surroundings are hygienic. T. L. Maddin⁶ adduces some examples in which large numbers of people were exposed to yellow fever without contracting the disease, and concludes from this that the disease is not contagious, but miasmatic.

Symptomatology and Diagnosis.—H. P. Jones,⁷ reporting upon yellow fever in the Isolation Hospital at New Orleans, states that the mortality in 216 cases admitted was 23.66%. Albumin was an almost invariable constituent of the urine. Black vomit occurred in 25 of the cases that recovered and in 39 of those that were fatal. Suppression of the urine was noted in 33 fatal cases and in 4 that recovered. Uremic convulsions were present in 40 of the fatal cases and in 12 that recovered. He believes that bile-stained casts are important in diagnosis, as he has seen them only in the urine of cases of yellow fever, while in other suspected cases casts were not bile-stained. Fifty-one post-mortems are recorded, the conditions found being dark fluid blood,

¹ Med. News, Nov. 13, 1897.

² Med. Rec., June 8, 1898.

³ New Orl. M. and S. Jour., May, 1898.

⁴ Va. Med. Semi-monthly, May 13, 1898.

⁵ N. Y. Med. Jour., Apr. 30, 1898.

⁶ Am. Medico-Surg. Bull., Nov., 1897.

⁷ Jour. Am. Med. Assoc., Feb. 26, 1897.

and intense congestion in the thoracic and abdominal viscera, the lungs often showing hemorrhages; the mucous membrane of the stomach was congested, softened, and eroded, the contents being of alkaline reaction owing to the presence of ammonia resulting from the decomposition of urea. The duodenum presented the same conditions as the stomach, but the severe congestions extended only to the common bile-duct. The intestines below were so congested as to appear raw. The liver was of boxwood color, and usually bloodless, excepting in cases of early death, when it showed areas of violent congestion. The kidneys showed violent acute inflammation, and Pothier, the pathologist of the hospital, noted that this began first in a line close to the bases of the pyramids. O. L. Pothier¹ records, as the result of his studies of yellow fever at the same hospital, that albumin and bile are constantly present in the urine, appearing in the first day or two in severe cases, about the fourth day in mild cases. The malarial plasmodium may be present even with yellow fever. Yellow-fever blood-serum does not cause agglutination of the typhoid bacillus. The change in the blood is chiefly limited to the loss of hemoglobin. He found a bacillus which seemed exactly the same as that reported by Sanarelli, and believes it is the specific cause of yellow fever. The lesions he found post-mortem were much the same as those observed by others.

John Guitéras² makes a most interesting communication on the **diagnosis of yellow fever** as a part of his report to the Government on the recent epidemic. Regarding the existence of the epidemic, he states that without seeing a single case of the disease he has often made up his mind that yellow fever existed from the reports of prevailing illnesses given by physicians. Various acute febrile attacks of mild character are reported and explanations given to show why they cannot be yellow fever. They are usually described as dengue, prevailing malarial affections, and the like. Some of the cases show albumin in the urine, the disease becomes extremely suspicious, and fatal cases occur, but are ascribed to intercurrent diseases. Most of these cases are in young people. Sometimes he has seen people on the street with an icteroid hue of the eye, which usually persists for some time after recovery, and he believes not rarely shows itself also as a premonitory symptom. Another indication showing epidemicity is furnished by the mortuary records. A characteristic feature is the increase in the number of deaths among the population, especially the young.

In the diagnosis of yellow fever Guitéras relies upon **the facies, the condition of the urine, and the pulse**. The face resembles that seen in typhus fever, with a more or less icteroid addition, the latter so faint that it is scarcely recognizable. The urine contains albumin early in the disease—third or fourth day. Albuminuria may be transient, and in mild cases perhaps only a trace in the evening urine of the third or fourth day. Granular casts may be found by careful centrifugation. The temperature and the pulse do not increase with equal pace. The characteristic feature is, that quite often while the temperature is rising the pulse may be falling. On the third or fourth day, for example, with an evening exacerbation of $\frac{1}{2}^{\circ}$ to 1° F. the pulse may be 10 beats slower than in the morning. He has seen the same discrepancy in true dengue and in other febrile diseases in the tropics, but this is exceptional, and in dengue the excessive fall of the pulse is associated with a distinct defervescence. The microscope does not establish the diagnosis during life, and as far as the present methods go it would be impossible to distinguish between a drop of yellow-fever blood and blood from a healthy man. [The author here probably means only in so far as the presence or absence of a bacillus is concerned.] The

¹ Jour. Am. Med. Assoc., Apr. 16, 1898. ² "Yellow Fever," Public Health Reports.

microscope, however, may have a negative value in excluding malaria. Regarding the relation of dengue to yellow fever, the author notes that it seems likely that the former disease aids in spreading the latter. F. W. Parham¹ discusses the **symptoms and diagnosis** of yellow fever. Like other recent writers, he alludes to three cardinal points in the symptomatology—viz., the disproportion of pulse and temperature ratio, the dusky flush of the face, and early albuminuria. In the study of the diagnosis he first refers to dengue, and calls attention to the frequent occurrence of the two diseases at the same time. The two diseases are undoubtedly distinct in nature. The differential points are placed in parallel columns, following the table of Matas. The differentiation of malarial fever from yellow fever is next considered. Curiously enough, the author does not refer to the examination of the blood and discovery of the plasmodium of malaria.

R. T. Morris² reviews the characteristics of the suspected **yellow-fever** cases occurring about Houston, Texas, during the summer and fall of 1897, and compares these with the symptoms of typical yellow fever and dengue. This comparison proves the cases observed to have been anomalous instances of yellow fever. They were like yellow fever and unlike dengue in the following particulars: there was a single paroxysm; the temperature rose regularly; the tongue was white on the center and red at the edges and pointed; the conjunctivæ were much injected; vomiting was frequent; there was moderate pain; jaundice was frequent, especially of the conjunctivæ; the secretions were deficient; the urine was albuminous; hemorrhages were frequent and alarming; there was black vomit. There were some deaths. The pulse was frequently disproportionate to the degree of fever.

H. A. West,³ considering the question of the existence of **yellow fever in Galveston** in 1897, states that he discovered albumin in the urine of numerous patients who were supposed to have dengue. He criticises the arguments of those who state that yellow fever did not exist there, and affirms his positive belief that yellow fever was present.

J. J. Archinard⁴ reports a case of yellow fever with autopsy, in which the most interesting feature was **coincident malarial infection**. The patient, a woman of 22, lived at St. Louis for a number of years, but sought the warmer climate of Mississippi on account of pulmonary trouble. She had been nine weeks in one part of the State, and then came to Ocean Springs, where she soon grew ill. She had fever, headache, and pains in the joints and extremities. She did not go to bed, but the next day the pains increased and she was compelled to take to bed. That night the temperature reached 104° F. and the pulse 120. The next day mucous vomiting occurred, and at noon the temperature had remitted; but about 1 o'clock the following morning it reached 101° to 101.8° F. The urine was dark and scanty. A few days later the vomit was yellowish and jaundice was seen; that night there was delirium; the temperature was 101° F. and the pulse 72. She was seized with convulsions and died. The urine contained 40% of albumin; there were bile, red blood-corpuscles, and granular casts. A careful examination of her blood showed the presence of the quartan malarial organism. The autopsy showed bloody liquid in the stomach and extravasation into the cells of this organ. The liver was quite fatty. Various microorganisms were isolated from the gastrointestinal tract and from the organs. [The difficulty of establishing a certain diagnosis of yellow fever in a case of malaria makes us hesitate in accepting the case and Pothier's observation (see above).]

¹ New Orl. M. and S. Jour., Oct., 1897.

² Southwestern Med. Rec., Jan. 22, 1898.

³ Phila. Med. Jour., Apr. 16, 1898.

⁴ New Orl. M. and S. Jour., Oct., 1897.

D. Bornio¹ reports a case presenting typical symptoms of yellow fever, but in which there was at no time any **albumin in the urine**.

O. Lerch² found a prompt response to the **Widal reaction** in a case which proved to be typical yellow fever, occurring in a man who had been freely exposed to this disease. P. E. Archinard, R. S. Woodson, and J. J. Archinard³ report the results of their examinations of a series of 100 cases in which the **agglutination-test** was applied to the *Bacillus ieteroides* and controlled by the coincident application to the *Bacillus typhi abdominalis* for the purpose of diagnosing or excluding yellow fever. The first 50 cases were typical yellow fever. The second 50 were suspected cases, and included instances of typhoid fever and malaria. Their conclusions are that the serum-diagnosis of yellow fever is practicable and important, and may be used on the second day. It is exceptionally present as late as 19 years after the disease. A dilution of 1:40, with a time-limit of one hour, is preferable for accuracy of diagnosis. The dried-blood method was perfectly satisfactory. They believe that the serum-method of diagnosis is particularly valuable in the beginning of epidemics in the diagnosis of doubtful cases, and should be instituted in all countries in which the disease occurs, either endemically or in epidemics.

Treatment.—J. Sanarelli⁴ states that he has obtained a **curative serum** for yellow fever from the horse after injecting filtered cultures. The first horse died suddenly after 7 months' treatment. The serum of the second horse had slight immunizing power after 5 months' treatment, while after 9 months' treatment the immunizing power had become quite marked. Serum recently taken from the bodies of those dead of yellow fever had no preventive power against the action of the *Bacillus ieteroides*, but serum from a convalescent who gave the reaction had slight protective power against this bacillus. Other animals than the horse were not favorable subjects for the production of the serum. Sanarelli⁵ records later the results of his use of **antitoxic serum** prepared from the *Bacillus ieteroides* by the inoculation of horses and oxen with virulent toxin. It was first used in small doses in 8 cases, with the result that 2 died and 6 recovered; all were severe cases. Small doses seemed to have but little effect, so that large doses were given, injecting 40 c.c. or more at once, and soon after giving 20 c.c. more, with the result that, for example, in one case there occurred an intense reaction a few moments later; the skin became bright red, the pulse fell to 88, and there was intense agitation with rigor. The temperature shortly afterward rose to 105° F. Next day the temperature dropped to 102° F., and on the fifth day the patient was convalescent. There were 14 cases treated by this method, and of these 10 recovered. Of the other 4, 1 was given too small doses, as he was thought to be less ill than was the case; and of the remaining 3, 1 rebelled against treatment and could not be properly managed; another was a woman in the eighth month of pregnancy still suckling 2 children and profoundly emaciated when admitted; and the last was an old, cachectic man with an enlarged liver and an enormous spleen and marked general weakness. Sanarelli also inoculated the inmates of a prison which became infected, and after this no new cases appeared. [Making every allowance for the enthusiasm of the author and his followers, it seems quite probable that serum-treatment in this disease will soon be placed upon a satisfactory basis.] T. S. Dabney⁶ discusses the treatment of yellow fever. In ordinary cases he advises the prompt administration of a **saline purge**, placing sodium sulphate at the head of the list. Within two hours

¹ New OrL. M. and S. Jour., June, 1898.

² New OrL. M. and S. Jour., Feb., 1898.

³ Dublin Jour. Med. Sci., June, 1898.

⁴ Jour. Am. Med. Assoc., Feb. 26, 1898.

⁵ Il Policlinico, Sept. 15, 1897.

⁶ New OrL. M. and S. Jour., Oct., 1897.

after this he would begin with Sternberg's modified bichlorid treatment, or some other form of intestinal antiseptis. He speaks favorably of beta-naphthol in 7½-gr. doses every hour or two, to be supplemented by a drink containing sodium benzoate; in addition, copious enemata of one to three quarts of cold water containing two ounces of sodium sulphate are recommended. Dabney¹ also states that judicious **bloodletting** is very valuable, and cites the case of a girl under his care, almost moribund from yellow fever, to whom leeches were applied. She was accidentally allowed to bleed excessively from their bites, and, although she appeared bloodless, began at once to enter into convalescence. Pena y Bueta² has secured 30 recoveries in 34 severe cases of yellow fever by giving large doses of **sodium sulphate** dissolved in a large quantity of water, and repeating this dose until the patient has taken ten tumblerfuls and has vomited copiously. The drug is given again in a quarter of an hour, until vomiting is once more induced, and smaller doses are given subsequently.

DENGUE.

I. B. Diamond³ states that his observation of 71 cases of dengue at **Houston, Texas**, showed him that albumin was occasionally present. Relapses occurred quite frequently, and during convalescence there was often a tinge of jaundice. In children, among whom he observed 23 cases, the disease often resembled typhoid fever. [The question of diagnosis in these cases is a matter of uncertainty. Others would undoubtedly have regarded these cases as mild and irregular yellow fever.] E. Hirschfeld⁴ reports his observations upon the **epidemic of dengue** which recently occurred in Brisbane. It often resembled influenza greatly, but was chiefly distinguished by the entire absence of respiratory symptoms. It occurred at any age, and was more apt to affect those in robust health. Patients who had typhoid fever seemed to be somewhat protected from the disease, as did those with tuberculosis, and the latter disease in some cases improved after the attack of dengue. Typhoid fever was of much less frequent occurrence during the epidemic of dengue than before. There seemed to be a definite immunity to second attacks of dengue; contagion was very evident. Among the interesting points in the symptomatology, which differed somewhat from common experience, he states that the pains were not in the bones, but were distinctly muscular. The rash often resembled scarlet fever very strongly, but one point that is peculiar to dengue is that the rash usually appears on the palms and soles. Nervous complications and sequelæ, particularly severe depression, were very common. The spleen was enlarged in about 25% of cases, and in one case there was acute splenitis. It is important to note that in a considerable proportion of cases there was evidence of very definite nephritis, and patients with previous kidney-troubles had very severe attacks. The joints were affected in about 2% of cases, those most frequently attacked being the joints of the fingers and the wrists. A relative bradycardia during the attack and in the convalescence was almost constant, and was, in the opinion of Hirschfeld, probably due to the influence of the toxin on the vagus. The mortality was but 0.31%, and hyperpyrexia, which occasionally occurred, was the only grave symptom with which he met. [Several points noted by the author are at variance with accepted descriptions of dengue. It is usually believed that second attacks are very common; that albuminuria is rare; that the mortality is almost *nil*; and that the pulse keeps

¹ Med. News, Nov. 13, 1897.

² El Monitor Medico, No. 245.

³ Med. News, Mar. 12, 1898.

⁴ Intercol. Med. Jour. Austral., Mar. 26, 1898.

pace with the temperature.] C. S. Hawkes¹ bases upon his study of a recent epidemic some observations on the clinical course of dengue. The incubation and prodromes were both variable; the onset usually was sudden, with chill and headache, followed by pain in the back and then in the joints. Vomiting appeared about the third day. On the second day there was a remission of symptoms, followed by an increase. A crisis occurred on about the fifth day. There were numerous aberrant cases, and children especially were apt to have abortive attacks. In some cases the temperature did not fall until the seventh or eighth day, and it then descended by lysis. In another class, which was very puzzling, the chief symptom was an irregular and prolonged fever. After the onset had passed there were usually no marked symptoms, excepting the fever and weakness. The typical eruption of the disease is the terminal rash, which may be scarlatiniform, morbilliform, petechial, or urticarial. There is often an evanescent initial roseolous eruption. There is always disturbance of the digestive system. Hematemesis was noticed but once, while epistaxis was common about the crisis. Albumin was very exceptionally present, and enlargement of the glands was very uncommon. Sequelæ were few, and were chiefly irregular pains, disturbance of digestion, furuncles, and, in a few cases, pleurisy and catarrhal jaundice.

THE BUBONIC PLAGUE.

N. D. Mason² found that in the great majority of 166 fatal cases of plague with buboes, the buboes were in the groin. This seemed to be explained by the fact that most of the patients went about in their bare feet, and were **infected through wounds of their feet**. The prognosis, according to his studies, seemed better in children than in men, and better in men than in women. The mortality without the antiplague serum was 83%, while with the serum it dropped to 60%, and he has no doubt that the decreased mortality was due to the serum. Injection of the serum caused an almost immediate fall of temperature and amelioration of the general condition. E. Roux³ speaks of the investigations of Wyssokowitz and Zabolotny on bubonic plague. These authors have endeavored to discover whether there could be an infection of the individual through the skin without its leaving any trace at the point of infection. They have experimented upon monkeys, which are very susceptible to the disease, and have found that they could infect them by pricking the skin and thus produce buboes, with absolutely no visible cutaneous lesion. They have discovered that the macaques with short tails are much more readily infected than the same variety with long tails, the first dying in from 2 to 3½ days; the second in about 4 or 5 days. The direct introduction of the virus in the trachea caused pneumonia; but if it were introduced into the stomach of monkeys, without injuring the buccal, pharyngeal, or esophageal mucous membrane, no infection resulted. The pneumonic form of the pest is always fatal. It is not always a simple plague-pneumonia, as the pneumococcus and staphylococcus are often combined with the plague-organism. They consider that the serum of Yersin has reduced the mortality from 80% to 40%. T. S. Weir⁴ presents a number of interesting facts in especial reference to the epidemic of plague in Bombay. The heavy flood that preceded the epidemic caused sewage to be thrown up through the manholes, and the subsoil-water reached a height which had never before been known. An interesting

¹ Intercol. Med. Jour. Austral., July 20, 1897. ² Birmingham Med. Rev., Sept., 1897.

³ Bull. de l'Acad. de Méd., July 13, 1897.

⁴ Report of Municipal Health Officer of Bombay, 1896-97.

and, he says, unvarying symptom in the initial stages of plague is a desire for purposeless wandering, which even leads the patients to take railway-trains, to distant points. The most rapid death he knew of occurred within 3 hours after the first intimation of illness. Haffkine's inoculations against plague were undertaken in 2156 persons, of whom only 4 were subsequently attacked, and, taking averages from other localities affected, it would have been expected that about 16 of these people would have died. Of 23 cases in which Yersin's serum was administered, 13 died and 10 recovered, so that he does not feel that the serum has come up to his expectations. He records 3 positively known cases of second attacks of the disease, so that one attack does not seem to confer absolute immunity.

G. Sticker¹ gives an extensive description of the **varieties** of plague. In many cases there is a secondary infection with the pyogenic bacteria. Many cases in the late outbreak at Bombay were of the form of **pestis minor**, and although they soon recovered they had the sequelæ characteristic of plague, such as paralyses, tachycardia, trophic changes, and acute tuberculosis. Diagnosis by the agglutination-test cannot be made after the disease has passed off, as mild cases do not give the Widal reaction. In 3 fetuses from mothers suffering from the plague the tissues were found entirely sterile, but there was marked parenchymatous degeneration from toxemia. In a number of cases the bacillus was obtained from the exudation of meningitis. The bacillus seemed to be in some cases rapidly destroyed after death, since it was not found postmortem when it had been found during life. B. II. F. Lewmann² records a case which greatly **resembled typhoid fever** for nearly a week, until small glandular enlargements were discovered in the groin, and the fluid removed from these by a hypodermic needle showed the presence of typical plague-bacilli. The patient died of plague, and showed no post-mortem lesions of typhoid fever. The same author³ records an instance of what he believes was **infection of sarcomatous glands with plague**. The patient had had enlarged glands in the axilla and neck for some months, when these became swollen and painful; the skin above was edematous; the patient had fever and the general appearance of plague. The symptoms subsided after a week. The excision and microscopic examination of a portion of the glands confirmed the diagnosis of sarcoma. [But from the symptoms given, it would seem that the diagnosis of plague is scarcely fully justified without the discovery of bacilli.]

W. F. Arnold⁴ reports some personal observations with the plague in China. Referring to the **diagnosis** of the disease, he alludes to a half-drunken condition as rather characteristic of the stage of invasion. He also alludes to ecchymoses as of use in diagnosis, though, like some other symptoms, they may appear too late to be of value. These ecchymoses result from the effect of the toxins upon the capillary vessels. The ecchymoses described specifically as **plague-spots**—the tokens of the Middle Ages—have been found to follow the bites of mosquitoes or of vermin. He himself did not see petechiæ of this kind, but he was not in Hong-Kong at the time of the activity of these insects. He refers to the class of cases in which no initial bubo is developed. These cases are now called pneumonic cases. He saw no reason for applying this name to them. The impression he gained from the description was that of an overwhelming infection through the gastro-intestinal mucous membrane; but he saw few cases during life. These did not present

¹ Münch. med. Woch., Jan. 4, 1898.

² Practitioner, Sept., 1897; Indian Med. Rec., Nov. 1, 1897.

³ Indian Med. Rec., Jan. 16, 1898.

⁴ Phila. Polyclinic, Jan. 8 and 15, 1898.

any evidence of important involvement of the lungs. Regarding the buboes, he notes that the pus is characteristically thick if its acute formation is considered; it is tenacious, grayish, and generally scanty. As to the manner of infection, it occurred to him that local infection through the skin explains the manner of spread of the disease. This accounts for the frequency of cervical buboes in children, in whom the habit of putting things into the mouth is of importance. With regard to the treatment, he was very favorably impressed with Yersin's work.

W. M. Haff'kine¹ reports upon the epidemic of plague in Lower Damann. This was very virulent, and caused a mortality of 2325 in a population of less than 11,000, and probably 2000 of this population had run away after the outbreak of the disease. **Treatment by "vaccination"** seemed very efficient, since 24.6% of over 6000 persons who were not inoculated died of the disease, while but 1.6% of over 2000 inoculated acquired the disease. In the latter part of the epidemic, when poorer vaccine was of necessity used, the results were less satisfactory, so that the immunity seemed to be directly proportioned to the strength of the vaccine.

Diendonne² gives a summary of the results of the **serum-treatment** of bubonic plague, stating that while the mortality after its first use was only 7.6%, the death-rate increased to 49% during the second period of its use; but the mortality during this epidemic in cases not treated with the serum was over 80%. The experimental use of the serum in susceptible animals shows that they require extremely large doses to produce immunity, while resistant species are protected or cured by comparatively small doses. The use of the serum in prophylaxis seems to have been distinctly successful, though the immunity lasted but a few weeks. In order to control the epidemic the most stringent hygienic measures should be insisted upon, all the excretions of the patients being disinfected, and rats, mice, and other lower animals as far as possible being destroyed. J. Morton³ treated two cases of bubonic plague with hyperpyrexia by hypodermic injections of a "weak" solution of **corrosive sublimate**, with the result that the fever disappeared and the patients soon recovered.

VACCINIA.

A. F. S. Kent⁴ has made studies upon vaccine-virus in the endeavor to discover the **bacteriologic cause of vaccinia**. Sections of the vaccine-vesicle showed the presence of a diplobacillus, which was found only in the tissues immediately about the vesicle, and was present from the beginning, and not only in the stage of suppuration, being found chiefly in the cells. The best method of staining it was a modification of Gram's method. The author comes to the conclusion that this is the true cause of vaccinia. The best culture-medium that he found was one containing glycerin and egg-albumin.

A. E. Boyd⁵ presents and discusses the **recommendations** of the **Vaccination Commission**, which consisted chiefly in an insistence upon the fact that variola occurs much less frequently in those that have been vaccinated; and if it does occur, it is of modified character. The protection is most marked during the years immediately after vaccination, and lasts for probably 9 or 10 years; then it rapidly diminishes, but still persists for at least 5 years. Its power to modify the disease does not diminish so rapidly as its power to prevent the disease. Revaccination restores prevention. Vaccination is more effectual

¹ Indian Med. Gaz., Jan., 1898.

² Münch. med. Woch., Feb. 8, 1898.

³ Indian Med. Rec., Nov. 16, 1897.

⁴ Lancet, May 21, 1898.

⁵ Dublin Jour. Med. Sci., July, 1897.

when done in several places. The Commission insists upon the necessity for reporting and isolating cases, and considers that the "honest objections" to vaccination are usually mere subterfuges. It recommends the use of liquid virus instead of the dry points. F. T. Bond,¹ in discussing the report of the Vaccination Commission, suggests that there be opportunity afforded to people who object to vaccination to apply for an order for suspension of vaccination of their children, but that people who are simply negligent should be dealt with severely. He recommends revaccination at the age of entering school, and considers revaccination essential.

L. Stumpf² publishes the statistics of vaccination for the Kingdom of Bavaria for the year 1896. Among other important facts illustrated in these statistics is the **value of liquid glycerinated lymph**. It was almost exclusively employed. The entire supply of lymph was obtained from 88 calves, which furnished 484,200 portions of lymph, or 552 per calf. The lymph prepared with glycerin was found to retain its power without change during the time it was necessary to be preserved. The author then refers to some individual cases showing peculiarities, but these are of no particular importance. [From but a few experiences we can substantiate the statement of this author and the one immediately following.] J. G. Adami³ decides that the admixture of glycerin with vaccine-lymph from a calf destroys the harmful microorganisms, and that only such lymph, properly prepared, should be allowed in medical practice. Lamb⁴ records a curious instance of **unconscious vaccination**. The father had attended to the child's arm, on which there were vaccine-sores, and had then on several occasions micturated without previously washing his hands. There subsequently appeared typical vesicles both upon his penis and upon the labia and the margins of the urethral orifice of his wife. These ran the typical course of vaccinia. A. E. Bieser⁵ records several **unusual experiences in vaccination**. In the first there was fatal hyperpyrexia, which he attributes to previous septic vaccination [but the connection does not seem very clear, and there was laryngeal diphtheria at the time]. In another case purpura followed vaccination. In a third there was an eruption of vaccinia in crops 10 days after vaccination; and in another, after inoculation upon the arm, there was found a vaccinal pustule upon the cheek, which seemed to be from infection from the finger-nails, and is interesting in that the inoculation must have occurred within the first few days after vaccination, and, therefore, during that period when immunity to vaccinia is not yet established by the first vaccination. R. W. Leftwich⁶ performs vaccination by cleansing the arm, scarifying, introducing the lymph, and then covering the spot with a disc of oiled silk which has been kept in absolute alcohol. Over this he applies an aseptic gauze-and-cotton dressing. Leftwich⁷ also suggests another neat method for **aseptic vaccination**. After sterilizing the arm and introducing the lymph, he covers the skin with hot boric gelatin, which rapidly sets into a transparent film, through which the progress of the vesicles may be observed. This is removed on the eighth day, boric acid dusted on, and another film applied. He has noticed that with this protection the classic "zone of redness" surrounding the vesicle does not appear.

M. B. Hutchins⁸ performs vaccination by denuding the skin by applying liquor potasse on wet cotton and allowing this to remain until it causes burning. The epidermis can be rubbed away after this and the vaccine introduced.

¹ Lancet, Dec. 18, 1897.

² Montreal Med. Jour., Jan., 1898.

³ Arch. of Pediatrics, Dec., 1897.

⁴ Ibid., Jan. 1, 1898.

⁵ Münch. med. Woch., Dec. 28, 1897.

⁶ Lancet, 1897.

⁷ Brit. Med. Jour., Dec. 11, 1897.

⁸ Jour. Am. Med. Assoc., Apr. 23, 1898.

This method is painless and does not frighten children. A. Seibert¹ has had a new **shield** prepared for use after vaccination. This consists of a felt disc with a gummed surface and an opening in the center, which is placed over the area vaccinated. Over this is put a small protective wire screen, and the screen is held in place by the application of a second disc placed upon the first.

VARIOLA.

Haushalter and G. Etienne² consider the hemorrhagic symptoms in variola due to secondary infection with the streptococcus, since they have found this organism in the blood of those dead of hemorrhagic small-pox. In one case of hemorrhagic septicemia in scarlet fever they found the staphylococcus. Vidal,³ in discussion, stated that he had also found the streptococcus in autopsies upon small-pox cases, and Sabrazes stated that his experience had been similar.

C. V. Dingle⁴ gives an account of the **epidemic of small-pox** which occurred in Middleborough in 1897 and 1898. The cases appeared as rapidly as 75 in a day, and were treated by the erection of temporary isolation-houses. Amongst the unvaccinated the number attacked was 10.2%, while amongst the vaccinated the number attacked was about 1.1%, the mortality in these two classes being, in the first 45.93%, while amongst the vaccinated it was only 8.46%, and but one case that had been revaccinated died. H. Roger⁵ presents a study of his service in contagious diseases. In small-pox he noticed, as an interesting symptom of the invasion, that the patients frequently complained of pain in the throat and difficulty in swallowing, and this would make one often suspect that scarlatina was appearing, were it not for the severe pains in the limbs. Albuminuria was, in general, infrequent; but in fatal cases it was almost constant. There are many other details of interest in the paper, which should be sought in the original.

F. Arnaud⁶ has made urinary examinations of 400 cases of variola. As a result, he observes that **albuminuria** is met with in 95% of cases, 32% having abundant albumin. The albuminuria is subject to marked oscillations in amount, and may be absent upon certain days. Hence there should be repeated examinations of the urine. The maximum amount is usually present at the beginning of the febrile period, less commonly during suppuration and desiccation. The albumin often appears in considerable amount when solid food is first taken and when the patient is allowed to get out of bed. Albumin was present in the urine in 75% of the cases during convalescence, usually in very small amounts. As a general rule, there was abundant albumin in the severe cases, and the amount was a useful element in prognosis, both as to the condition of the kidneys and the general state of the patient. Sudden uremic attacks may occur at any time, even in convalescence. If they occur during convalescence, he believes they are always due to a lesion of the kidneys which has existed since the inception of the disease, and thinks there is no such thing as a distinctive albuminuria of convalescence. The albuminuria is due to a lesion of the kidneys, this lesion being of either the interstitial form or of the epithelial form: in the former case being composed of small islands of round-cell infiltration analogous to the skin-eruption. The epithelial and interstitial forms are commonly combined in greater or less degree. He believes that some chronic lesion of the kidneys practically always persists, being, however, extremely slight, as a rule, and causing practically no symptoms; but it is to

¹ N. Y. Med. Jour., Feb. 19, 1898.

² Quatrième Congrès Franç. de Méd. int., 1898.

³ Ibid.

⁴ Lancet, Apr. 23, 1898.

⁵ Rev. de Méd., Aug. 10, 1897.

⁶ Ibid., May 10, 1898.

such lesions of the kidneys following infectious disease that he would attribute all cases of so-called functional albuminuria.

Treatment.—J. Moir,¹ from his experience with about 4000 cases of small-pox, decides that the use of masks, puncturing the pustules, and such treatment, are entirely valueless. He increases the elasticity of the skin by having it rubbed with oil early in the disease, and believes that the resulting deformity is very much lessened in this way, as is the danger of corneal ulceration lessened by painting the insides of the eyelids with extract of belladonna made into a paste. He has never seen recovery from actual hemorrhagic small-pox, though a little bleeding from various places may be followed by recovery. In 2 instances he saw women delivered during an attack of small-pox, and in neither of these cases did the child acquire the disease. Kolcasenko,² after the use of **ichthyol** as a local application in 10 cases of variola, states that it controls the temperature to some extent, shortens the course of the disease, and in a measure prevents septic intoxication.

CHOLERA.

W. F. Arnold³ gives an interesting study of cholera in the various epidemics in Japan. He describes the hygienic conditions among the Japanese, and attributes the spread of the disease, after it has once started in the country, to their very imperfect sanitary arrangements. He does not believe Japan will become a permanent home for cholera. E. H. Hankin⁴ found that the water seemed to be considerably purified, and an outbreak of cholera was distinctly limited by putting potassium permanganate in the wells in an amount sufficient to give the water a pink color. Generally from 2 to 3 oz. were needed.

TYPHUS FEVER.

A. Bray⁵ states that one of the important diseases producing a high mortality in Mexico is typhus fever. The course that it pursues often varies from the typical. Many cases are only classed as typhus because they have the typical rash, and the greater number of fever-cases met with in Mexico are not to be classified according to the accepted methods of to-day, since they have no definite history, and a very irregular course, usually associated with chills and anemia as constant symptoms. There is no reason for supposing that these are cases of malaria, and quinin is usually harmful. The best method of treatment, in Bray's experience, is the use of calomel, with plenty of water by the mouth, and reduction of the temperature by antipyretics and baths. A considerable percentage of the cases result fatally. E. J. McWeeny⁶ notes the negative result of examination of the blood in two cases of typhus fever. In neither could microorganisms be obtained from the blood. Nefedieff⁷ used methylene-blue in 4 cases of recurrent typhus fever, with unfavorable results. It, at any rate, did not cut short the attacks, and even seemed to increase their length.

STREPTOCOCCUS INFECTION.

Chauvel⁸ reports, for Lettelier, a case in which pneumonia was followed by **purulent pleurisy**. The empyema was relieved by operation, but the

¹ Edinb. Med. Jour., June, 1898.

² Report of the Surgeon-General of the Navy, 1897.

³ Pacific Med. Jour., Sept., 1897.

⁴ Gaz. hebdom de Méd. et de Chir., Aug. 6, 1897.

⁵ Bull. de l'Acad. de Méd., Mar. 8, 1898.

⁶ Vratsh, No. 13, 1897.

⁷ Brit. Med. Jour., Jan. 22, 1898.

⁸ Brit. Med. Jour., Apr. 2, 1898.

patient had a general eruption of pyemic abscesses and became profoundly prostrated. **Antistreptococcic serum** was used 51 days after the onset of the pneumonia, and when a fatal result was thought to be almost inevitable. There followed rapid improvement of the general condition and of the local purulent foci, and entire recovery occurred. In 3 cases of erysipelas of the face, Chauvel has seen this serum cause rapid disappearance of the fever and redness and limitation of the process; but the observations of many others have been so contrary to his that he has doubt as to the actual value of the serum. In a case of phlegmon of the arm, which he reports, the serum was injected in a total amount of 140 c.c., without the least effect. In both this and the first case the streptococcus had been found in the pus in pure culture.

W. M. Young¹ reports the use of **antistreptococcic serum** in a case of facial erysipelas. The disease subsided on the following day (the third). She had an erysipelatous eruption on the shoulder 2 days later, but there was no fever, and the eruption soon subsided. Lobit² used **iodin** as an abortive in 25 cases of facial erysipelas, making a 10% solution of the drug in collodion and painting this over the inflamed area. He states that the redness and swelling disappeared rapidly and the pain became less. He thinks that the effect was due to its bactericidal properties.

ERYSIPELAS.

Parascandolo³ has investigated the relation of the *Streptococcus pyogenes* to the *Streptococcus erysipelas*. He finds that the serum of an animal immunized to one of these organisms prevents a growth of the culture of the same organism, and cures animals that have been injected with such cultures, but neither organism has the same protective effect against the other, so that the author believes that the organisms are different, and that for the treatment of erysipelas antistreptococcic serum must be prepared from the *Streptococcus erysipelas*. He has found that the best method of immunization is by the use of toxins from virulent cultures, and not of the cultures themselves. [The opinion of bacteriologists is quite generally opposed to the author's view; and it will be necessary to establish his contention regarding the lack of relationship of the streptococci more firmly before the practical points regarding treatment are accepted.] During two days T. S. Kirkbride⁴ found **leucin** and **tyrosin** in the urine of a patient with erysipelas, the disease being on the decline. The patient entirely recovered. This is further evidence that leucin and tyrosin are not always indicative of acute yellow atrophy. [This conclusion is supported by a number of similar observations in various infectious diseases.]

RELAPSING FEVER.

H. Lowenthal⁵ has used the agglutination-test with living spirilla in relapsing fever. Thirty times he had positive results; 9 times negative. In 14 cases he made the diagnosis after the disease was past, and thus in each of these cases determined that a previous illness of doubtful character was relapsing fever. With serum-treatment he has found that inoculation during the apyretic intervals prevents relapse in half the cases. The prognosis was aided by

¹ Brit. Med. Jour., Dec. 11, 1897.

² Bull. gén. de Thérap., vol. cxxxv., p. 540.

³ Wien. med. Woch., Nos. 38 and 39, 1897.

⁴ Centralbl. f. innere Med., No. 41, 1897.

⁵ Proc. Internat. Med. Congress, Moscow, 1897.

the injection of immunizing serum. If there is a reaction of 1 hour on the seventh day of apyrexia, one may predict that no relapse will occur. Of 84 cases injected with immunizing serum during apyrexia, over 46% showed no relapse. Of 152 cases not so treated, only 16½% showed no relapse. Carrieu and Pelon¹ saw symptoms of septicemia develop in a case of grip. The sputum contained numerous streptococci, and this led to injections of Marmorek's serum, with the result that the temperature fell and rapid recovery ensued. C. P. Thomas² has used Marmorek's antistreptococcic serum in 8 cases of sepsis, with satisfactory results in all instances, the temperature and general condition in most of the cases improving greatly after the dose. In several cases the remedy was used almost immediately after infection of the peritoneal cavity with pus, and these cases ran a favorable course; but in all of them the abdominal cavity was also cleansed. H. E. Littledale³ records a case of pyemia which was treated by antistreptococcic serum without any good effect. The serum seemed rather to make the symptoms worse, and examination of another bottle of serum from the same source showed the **presence of living streptococci**. K. W. Milligan⁴ injected antistreptococcic serum in a case of cellulitis which had appeared in numerous parts of the body, and had been persistently present in the pelvic tissues. After these injections the discharge became more serous, the lymphangitis disappeared, and the local swelling of the thigh, which was present at this time, soon vanished, but there had been surgical interference and evacuation of pus as well, and a good deal of the effect may have been due to this. Agnes C. Viator⁵ records a case in which a woman who had been operated upon for purulent salpingitis, of probable gonorrheal origin, developed septicemia. She was given repeated injections of streptococcic antitoxin. The temperature fell occasionally, and the author believes that the general condition was very greatly improved, and that the improvement was largely due to the antitoxin. [The temperature-record, which is published together with the description of the general condition, does not seem to show any marked effect from the antitoxin, and if the case were, as the author believes, one of gonorrheal toxemia, it would seem somewhat irrational to expect improvement from streptococcic antitoxin.]

STAPHYLOCOCCUS INFECTION.

Masius and Beco⁶ record two cases of **pyemia** due to the staphylococcus, in both of which they discovered the microorganisms in the blood. The first case was of very doubtful origin; in the second case it is quite probable that the pleurisy, which was the first pyemic lesion, was set up by an infection from near-by tubercular cavities of the lung. O. Kose⁷ has injected animals with virulent cultures of the staphylococcus after injection of attenuated cultures. These animals did not die. Their blood caused a marked agglutination of staphylococci, and these organisms would not grow on their blood-serum. He believes that this is a matter of marked importance, as it may indicate that we have in Widal's method a means of making an accurate diagnosis of the nature of infection in endocarditis and septicemias. He also suggests that an antistaphylococcic serum may be more readily prepared than an antistreptococcic serum, since staphylococci are not so variable in virulence as are streptococci.

¹ Quatrième Congrès Franç. de Méd. int., 1898.

² Brit. Med. Jour., June 25, 1898.

³ Boston M. and S. Jour., Mar. 31, 1898.

⁴ N. Y. Med. Jour., Feb. 19, 1898.

⁵ Rev. de Méd., July 10, 1897.

⁶ Gaz. hebdom. de Méd. et de Chir., Sept. 9, 1897.

⁷ Jour. Am. Med. Assoc., Dec. 18, 1897.

PNEUMOCOCCUS INFECTION.

F. Bezancon,¹ after examining 12 cases of different affections due to the pneumococcus, found that the serum of these patients possessed agglutinative properties toward the pneumococcus. In one case he believed that he was able by this means to establish the fact that a previous infection of doubtful character had been due to the pneumococcus.

C. Tournier and P. Courmont² record a case of **pneumococcic arthritis** which occurred in a man of 50 years, who was in the secondary period of syphilis and also had pneumonia. The arthritis appeared on the sixth day of the pneumonia and ran a subacute course. Arthrotoomy was done three days after the first symptoms of trouble with the knee, but the general condition was not improved. An arthritis of the shoulder, which ran a like course, appeared, and the patient died from sepsis. There were found purulent diaphragmatic pleurisy and subacute interstitial pneumonitis. The authors note as the characteristics of pneumococcic arthritis that it usually runs a subacute course, but is of the greatest gravity, and causes enormous swelling, intolerable pain, and elevation of the temperature, with a grave general condition. The prognosis tends to be unfavorable, as the pneumococci are likely to be carried throughout the system. They divide the condition into various forms, one of which is mild and without definite lesion; one is a simple hydrarthrosis; the third and more common form is purulent. The general dissemination of the pneumococcus seems to be due to some specially susceptible condition of the tissues. This was supplied by the previous syphilis in the case recorded.

INFECTIOUS EMPHYSEMA.

A. G. Nicholls³ reports 3 cases of **infection by the *Bacillus aerogenes capsulatus***. Cases of gaseous phlegmon, physometra, pneumaturia, and the condition called by the Germans *Schaumorgane*, in which the viscera are filled with gas-bullæ and the blood with bubbles, were found by Fränkel to be due to a bacillus (*Bacillus phlegmonis emphysematose*), and this was later identified with the *Bacillus aerogenes capsulatus* of Welch, Nuttall, and Flexner. Cases, however, are still quite rare or overlooked. Since 1895, 6 instances have occurred in Montreal, and the author now reports 3. The first, a man of 21, was taken suddenly ill with abdominal pain. There were abdominal resistance and tympany, dulness over the lower part of the right lung, and diminished expansion. Perforative appendicitis was suspected and operation performed, confirming the diagnosis. Later the chest was aspirated and clear serum removed from the right pleura. Subsequent crackling resembling metallic tinkling was heard over the heart with each beat, and still later splashing-sounds could be heard at some distance from the patient. A tympanic sound developed over the heart, and there was a slight metallic ring to the coin-test. The patient soon died, and at the autopsy a right-sided empyema was discovered, the liquid having a foul odor. There was also a smaller cavity containing grumous liquid. There were patches of lobular pneumonia in the left lung; the right lung was wholly carnified. The epicardium and pericardium showed a dirty, dry, white appearance, with streaks of dark red—evidently modified blood. The cavity was greatly enlarged, and contained 20 to 25 c.c. of dark-red liquid. There was no perforation into the pericardium. In the abdomen were found evidences of peritonitis, and in the retroperito-

¹ Quatrième Congrès Franç. de Méd. int., 1898.

² Rev. de Méd., Sept. 10, 1897.

³ Brit. Med. Jour., Dec. 25, 1897.

neal tissues an extensive cavity containing grumous liquid. This cavity communicated with a subdiaphragmatic abscess above the liver. There were therefore a pyothorax, hemothorax, and pneumothorax; a pyopericardium, hemopericardium, and pneumopericardium, and widespread septic inflammations. Pyogenic microorganisms and the *Bacillus capsulatus* were discovered. In the second case the infection extended from the intestine into the gall-bladder, and then into the liver and other viscera; and the gas-production was evidently a post-mortem event. The blood contained bubbles and the liver presented a soft, parboiled appearance. The bile-ducts were dilated and sacculated. The third case, a woman of 53, was admitted with hernia and obstruction of the bowels. The legs were edematous and the urine contained albumin and casts; she was etherized, but died in a few moments, after vomiting a brownish liquid having a fecal odor. Death was apparently due to inhalation of the stomach-contents, and this was confirmed by autopsy. The subcutaneous tissues were found emphysematous, gas escaped from the peritoneal cavity, and the stomach and bowels were much distended. Bubbles of air were seen under the pleura; the epicardium and the blood contained bubbles. The kidney-tissues and the spleen crepitated to touch, but the liver pitted on pressure and was friable. The *Bacillus aerogenes* may have gained entrance during life, but the development of gas was certainly post-mortem. The other 3 cases have been reported by other physicians of Montreal.

GLANDERS.

H. Morel¹ describes the **articular affections of glanders** in man. The symptomatology may show in the early stage articular pains; these are, in fact, habitual in the acute cases. Or there may be a periarticular inflammation, which, too, is one of the most frequent manifestations of the malady, though it is found as well in other infectious diseases, particularly in gonorrhea. True arthritis occurs in at least 10% of the acute cases, but it is much less common in the chronic form. The limb swells and becomes red, and is apt to present the same appearance as in acute articular rheumatism. In some cases there may be coincident glandular swelling and a tendency to abscess-formation, which will clear up the diagnosis; but this is not always seen. Morel reports two cases associated with glandular swelling. In certain cases this arthritis is a matter of little importance, and is but a collateral symptom associated with the development of extensive abscesses in the nasal cavities and elsewhere. The course of the arthritis during the progress of the disease is very variable. It may at times go on to the formation of pus, or it may entirely disappear. The difficulty in diagnosis is very great when there is uncomplicated arthritis, but the occurrence of nasal and pulmonary disease, and of subcutaneous swellings resulting in abscess, will usually make the case clear, and the glanders-bacillus may be frequently discovered in the discharges. The reaction of a guinea-pig to an injection of the fluid is often sufficient to make a diagnosis. Morel somewhat doubtfully suggests the use of an injection of mallein in the human being for the purpose of establishing a diagnosis.

WEIL'S DISEASE.

L. Klein and F. Schütz² report 6 cases of Weil's disease. In all of these there were the characteristic symptoms: fever, nephritis, and icterus. The fever rose rapidly, reaching high degrees, and then declined by lysis, which

¹ *Gaz. hebdom. de Méd. et de Chir.*, May 8, 1898.

² *Wien. med. Woch.*, Feb. 5, 1898.

took 5 to 6 days. The urine always showed distinct nephritis. The icterus was also marked, the liver enlarged, the spleen nearly always palpable, and there were usually marked nervous symptoms, especially mental, such as delirium. There was severe vomiting, and muscular pains were practically always present, as were superficial hemorrhages. Almost all the cases began with sore throat. All of them resulted in recovery. No definite source of infection could be discovered. A. Holz¹ records a case of Weil's disease in a woman 51 years old. The symptoms were quite characteristic, beginning with chills, headache, vomiting, and pain in the splenic region. The spleen became enlarged; the urine contained blood and albumin; icterus appeared; and the liver swelled and became tender, but improvement occurred. [The occurrence in a woman is noteworthy.]

LEPROA.

W. Havelburg² notes that Piso states in his writings that leprosy was unknown in Brazil before 1644. In 1697 there were, however, large sanatoria for lepers. The explanation of this sudden outbreak of leprosy is found in the fact that large numbers of Portuguese had meanwhile immigrated to Brazil. S. P. Abraham,³ after a collective investigation of leprosy in the British Empire, states that a certain small number of cases is always to be met with in Great Britain and Ireland, but there is no reason to believe that they are more numerous now than at any other time. All these patients, with the possible exception of one, were infected after a sojourn in districts where leprosy is endemic; but, although these cases have never been really isolated, there has been no evidence of their having infected others in Great Britain. S. P. Impey⁴ believes in the **non-contagiousness** of anesthetic leprosy, because in these cases the destruction of tissue does not occur at the situation of the disease in the nerves, but below, at the peripheral distribution of the nerves, and bacilli do not escape from these sores in the anesthetic cases. Believing that he is right in this view, he contends that it is not necessary to isolate such cases, and it is absolutely wrong to put them in institutions with cases of tubercular leprosy, since the anesthetic cases tend to get well more rapidly than the others, and may be reinfected if they are segregated with tubercular cases. P. A. Morrow⁵ quotes a large number of cases in which leprosy lesions were found in the upper respiratory passages, and also records the views of a number of authors that chronic coryza is often the first manifestation of leprosy. His own view has been for a number of years that this is the case, and he has long considered it important to direct attention to the danger of **infection from the nasal secretions**. A. W. Hitt⁶ argues in favor of the careful **examination of immigrants** coming from a country infected with leprosy immediately upon their landing, and a second examination before granting naturalization-papers.

E. Baelz⁷ states that in 21 years of observation in Tokio he has never seen **contagion** in leprosy, even though cases lay in hospital-beds next to individuals with other affections. Nurses who came constantly in contact with these cases were never infected. In one instance, in which a man and wife had had leprosy for years, the wife recovered and remained well, while the man still remained in a horrible condition. Baelz recognizes the contagiousness of the disease, but says that contagion is extremely rare, and this rarity he attributes

¹ Deutsch. med. Woch., Mar. 10, 1898.

² Berlin. klin. Woch., Aug. 16, 1897.

³ Brit. Med. Jour., Nov. 13, 1897.

⁴ Med. Brief, Dec., 1897.

⁵ N. Y. Med. Jour., Apr. 30, 1898.

⁶ Chicago Med. Recorder, Sept., 1897.

⁷ Berlin. klin. Woch., Nov. 15, 1897.

to the rarity of discharging ulcerations. In the diagnosis of leprosy he considers a pale, waxy luster of the skin an important point, and emphasizes the value of thickening of the nerve-trunks, particularly of the auricularis magnus, which is palpable in 90% of leprosy-cases, but in leprosy only. In his experience, except in late stages, the tendon-reflexes have been always increased. The behavior of the skin to anilin-dyes is important; if such dyes are rubbed on the skin, which is then covered with cotton, and pilocarpin injected to induce sweating, the healthy parts become stained with the dye, while leprous parts, perhaps otherwise not noticeable, do not become stained, since they do not sweat. He has found general symptoms, both in the beginning and in the course of the disease, usually absent in Japan, as is pain on pressure over nerves. Especial vulnerability of the leprous parts was not noticed, and wounds usually healed particularly well. Cachexia was absent. He treats the disease with chaulmugra-oil in large doses, local applications of salicylic acid, and Kusatsu baths, which latter are strongly irritating to the skin. Four cases which had been under his treatment are reported. All had nearly or quite recovered. W. Osler¹ records a case of leprosy in a woman, 30 years of age, which was observed in Baltimore. This patient had, however, lived in Demerara 14 years before for a few months, and probably acquired the disease there. The tubercular masses had been diagnosed lues, and she had been on antisyphilitic treatment without benefit. She had widespread tubercles and marked discoloration of the skin, but practically no disturbance of sensation. After an investigation of the disease as it occurs in the United States and Canada, and correspondence with physicians associated with institutions for lepers in these countries, Osler states his convictions that the disease is not progressing here, and that there need be no special fear of its increase. A. Hobel² describes a case of leprosy which had probably been acquired in Brazil. An interesting point was that he discovered the bacilli in scales cast off from the skin during a bath in a bichlorid-solution, as well as in the fluid of a blister. In the later course of the disease he noted blue edematous swellings in the skin, which appeared and disappeared suddenly. An autopsy was undertaken, but no changes were found in the spinal cord, although the patient had had marked anesthesia and muscular atrophy during life. Pellizzari³ has observed a **peculiar case** of leprosy of remarkably slow and benign course in a woman 57 years old. The only evidence of disease was in a cicatrix along the median cephalic vein and in a near-by small zone, which was yellowish or brownish or in part atrophic and without pigment. The histologic examination showed that there was infiltration, particularly around the sweat-glands, being neither of the tubercular nor anesthetic character in its histology, but simply leprous infiltration. The inoculation probably occurred at the time of a blood-letting, 48 years before. C. C. Hersman⁴ records a case of anesthetic leprosy which he observed in Pittsburg, Pa. The man had been in Brazil, but had left there 12 years before the disease appeared. The leontine form of the affection gradually developed, with widespread anesthesia. The bacillus was demonstrated in the skin. Pelham-Wykesmith⁵ records a case of leontine leprosy observed in London in a boy 8 years of age. The disease began with tingling sensations and swelling of the legs, hands, and face, followed by pigmentation, which became general. Anesthesia appeared later, and finally became total. W. A. Pusey⁶ reports a case of a man with leprosy, in whose blood he found in large numbers what he believes were the **lepra-bacilli**.

¹ Bull. Johns Hopkins Hosp., Mar., 1898.

² Settimana Med., No. 24, 1897.

³ Brit. Med. Jour., July 3, 1897.

⁴ Deutsch. med. Woch., Mar. 3, 1898.

⁵ Alienist and Neurol., Jan., 1898.

⁶ Chicago Med. Recorder, Sept., 1897.

L. F. Alvarez¹ uses the following method for the **discovery of the lepra-bacillus** in tissues. He triturates a fragment of the tissue in normal saline solution until he has a homogeneous solution. A portion of this is then stained by the Ziehl-Nielsen method. If necessary, the solution is centrifugated. He considers this a certain method.

Treatment.—Carrasquilla² reports upon his method of treating leprosy by injecting **antileprous serum**, which is prepared by injecting the serum of a leprous patient into horses. Buzzi³ records a case of leprosy which showed marked improvement under the use of Carrasquilla's serum. Hallopeau⁴ reports of Carrasquilla's method of serum-treatment that the serum **contains streptococci, staphylococci, and bacilli**. In 3 cases the treatment was a complete failure in his hands. In 4 cases there was amelioration, but there is doubt in these cases as to the part played by the serum. Hallopeau⁵ reports later on Laverde's serum-treatment of leprosy, that it depends upon the injection of animals with the blood of leprous patients and with the triturate of leprous nodules. A reaction always follows the use of the serum of these animals when they have been treated for one or two months, and leprous patients treated with serum prepared in this way have improved both in the lesions of the skin and mucous membranes and in the nervous symptoms.

I. Dyer⁶ gives a preliminary report on the use of **antivenomous serum** in the treatment of leprosy. The serum was obtained from Calmette's laboratory, and the dose used was from 1 c.c. to 11 c.c. No other treatment was used excepting strychnin. In 4 or 5 cases so treated there was marked improvement, and in one a practical disappearance of the lesions. In one case only, a frail and aged patient, were there negative results. W. T. Parker⁷ considers sterilized blood-serum from the horse one of the most valuable methods of treatment of leprosy. Although it is not claimed that it invariably produces a cure, it is said to act as a tonic, and to increase the number of red blood-corpuscles without causing any unfavorable effects. E. Joseph⁸ treated a case of advanced tubercular leprosy with the extract of **chelidonium** in ointment without very much relief, but when the same drug was exhibited by the mouth there was marked improvement.

TUBERCULOSIS.

Etiology.—Flügge⁹ points out that recent writers have centered their interest in the dried sputum in considering the propagation of phthisis. He does not believe that it has been proved that this is a mode of contagion, as nearly all experimental work in this line has been negative. But a lesion can be produced almost with certainty if animals are made to inhale minute drops of infected **sputum in moist condition**, and he directs attention to the possibility of conveyance of the infection in the minute drops of sputum which are constantly ejected from patients while coughing, sneezing, and the like. Experiments which he carried on by having patients exhale deeply, sneeze, or cough in the neighborhood of culture-plates, showed that this is a matter of importance, since he has obtained cultures of the bacillus in this way, so that it is evident that people in constant contact with tubercular subjects are themselves in decided danger of acquiring the disease, even when there is no opportunity

¹ Pacific Med. Jour., July, 1898.

² Deutsch. med. Woch., Oct. 14, 1897.

³ Ibid., Jan. 11, 1898.

⁴ Med. Times, Oct., 1897.

⁵ Gaz. méd. de Liège, Oct. 7, 1897.

⁶ Bull. de l'Acad. de Méd., Oct. 4, 1897.

⁷ New Orl. M. and S. Jour., Oct., 1897.

⁸ Deutsch. med. Zeitung, xviii., No. 57.

⁹ Deutsch. med. Woch., Oct. 14, 1897.

to inhale dried sputum. [The author does not deny what has been certainly established by experiments: that dust containing dried tubercle-bacilli may cause the disease. If this be admitted, his contention that the importance of infected dust has been overestimated loses value, since the viability of the bacillus in dust must be enormously greater than that contained in moist sputum, even admitting that small particles are sometimes expelled, which, however, his experiments do not conclusively prove.] Marfan,¹ in considering the **contagiousness** of tuberculosis, records an instance of 22 employes in one office. One of these died of phthisis, and within four years 13 of the 22 employes in this office likewise succumbed to tuberculosis. He insists that there should be public supervision of tubercular cases, and in especial the use of spit-cups should be required. L. Woodruff² insists upon the danger of **contagion from tuberculosis in schools**, and contends that no one with this disease should be allowed to attend school or to teach school. He describes a case in which phthisis seems to have been contracted by a teacher from contagion passed on from his predecessor, who had died of this disease. [It is difficult to prove contagion in cases like the one cited, and authors differ greatly in their inclination to accept or deny the connection between cases occurring successively in a certain room or house. Those who are advocates of restrictive measures for the most part exaggerate the dangers of contagion.]

S. W. Abbott³ contends that phthisis is much more common in persons who have **in-door occupations**, and is especially common in females at the age when, as compared with males, they live chiefly within-door. He insists that there is no evidence that contagion ever occurs in out-door life, while it certainly frequently occurs from in-door exposure.

Gibert⁴ states that he has investigated the mortality from tuberculosis in Havre in relation to the various streets in that city, and finds that there is the most striking variation according to **density of population**. Those streets in which the population is very dense, and in which there is therefore ready opportunity for contagion, always have a very much higher mortality than those in which a comparatively small number of people dwell.

A. Ransome⁵ contends that **consumption is a disease of filth**. Government reports show that the disease has declined greatly in the last 60 years, and he considers this due to better sanitation. He notes that it is shown that tubercle-bacilli retain their virulence much longer in poorly ventilated and ill-cared-for houses than they do where there is plenty of sunlight and good ventilation, and he has found that condensed vapor of the breath of human beings or of the air from cellars and other ill-ventilated places makes a good medium for the culture of tubercle-bacilli. He thinks that the compulsory notification of the disease is not desirable, but suggests the adoption of a method like that now in use in Manchester—namely, the issuing of instructions regarding disinfection, and, after notification of the presence of a case of phthisis, the disinfection of rooms or houses free of charge.

C. F. Gardiner⁶ discusses the question of the **possibility of infection in health-resorts** in high altitudes, especially in Colorado Springs. The air in this town was found to contain about the same number of bacteria as in other places, while in the surrounding country the air was sterile. But dust taken from a hotel in which there was usually a large number of tubercular patients did not cause tuberculosis in guinea-pigs, nor did the dust from a sanatorium. In the last 20 years only 20 cases of indigenous tuberculosis have

¹ Rev. de la Tuberculose, Dec., 1897.

² Boston M. and S. Jour., Jan. 6, 1898.

³ Lancet, Jan. 1, 1898.

⁴ Cleveland Med. Gaz., Sept., 1897.

⁵ Bull. de l'Acad. de Méd., May 24, 1898.

⁶ Am. Jour. Med. Sci., Feb. 18, 1898.

been observed in Colorado Springs. The disease is also extremely rare in cattle in Colorado. S. G. Bonney¹ contends that tuberculosis originates in Colorado from contact with other patients, or in any other way, only with the most extreme rarity. He recites the experience of a number of men in proof of this view, and contends that contrary statistics based upon health-board reports are insufficient proof that the cases originate in Colorado. W. Aebi² believes that the observations which he has been able to make upon the population at Davos show that there has been no increase of tuberculosis since this place has been so frequented by phthisical subjects.

C. W. Dulles³ brings forward the observations of a number of men connected with institutions for consumptives. Their statements that they have rarely seen contagion are used as a proof of the non-existence of contagion in this disease. The author further advances his own belief that **the disease is not contagious**. [The evidence of physicians of hospitals for consumptives is not always reliable, as there is a natural tendency on the part of such physicians to minimize the dangers to the healthful in the institutions under their charge. The evidence of physicians of large general hospitals with special phthisis-wards would probably be different. The danger of contagion is no doubt exaggerated by some. It is unnecessary to attempt any reply to the view that consumption is not at all contagious.]

D. H. Bergey,⁴ in discussing the public-health relations of tuberculosis, asserts his belief that the lower mortality from tuberculosis exhibited by the Jewish race is due largely to their careful **meat-inspection**.

Lidia Rabinowitsch⁵ has investigated 80 specimens of **butter** in the search for tubercle-bacilli, injecting guinea-pigs with portions of the melted butter. In 23 of the specimens there was a bacillus which resembled the tubercle-bacillus in all points and produced lesions which were analogous to those of tuberculosis, but which were, however, not identical with tubercular lesions. This pseudotubercle-bacillus had all the morphologic and staining-properties of the true bacillus, but differed in its cultural peculiarities, colonies growing at ordinary temperature in 2 or 3 days, and being more abundant than in cultures of the true bacillus. The lesions produced in animals rarely contained giant cells, and looked more like glanders than tuberculosis; the animals thus infected did not react to tuberculin; and the bacilli were not pathogenic to rabbits or mice. [If these observations are confirmed, several interesting problems will be suggested. The nature of the bacillus discovered by the author, and its relations to the tubercle-bacillus (human, bovine, or both), are questions of first importance.]

Schrader⁶ records the case of a man of 29, who fell, striking the left side of his back, and the next day had signs of beginning pneumonia in the portion of the lung beneath the external area injured. Six weeks later tubercle-bacilli were found in the sputum, and the patient grew rapidly worse, but after 4 weeks more improvement set in, and he recovered entire health. The author believes that it was a case of **traumatic tuberculosis** of the lungs. [Of course, traumatism merely establishes a *locus minoris resistentiae*. Another case in point is the following.] R. E. Lord⁷ records a case in which tubercular pneumonia followed a fracture of the ribs.

Pathology.—Dubard⁸ reports that he found **in certain carp** large tumors, which so swelled the abdomen as to attract attention. These were found

¹ Boston M. and S. Jour., Sept. 2, 1897.

² Correspondenzbl. f. Schw. Aerzte, Jan. 15, 1898.

³ Boston M. and S. Jour., Sept. 2, 1897.

⁴ Phila. Med. Jour., Apr. 9, 1898.

⁵ Zeit. f. Hyg. u. Infectiönskr., vol. 26, p. 90, 1898.

⁶ Berlin klin. Woch., No. 46, 1897.

⁷ Lancet, May 7, 1898.

⁸ Rev. de la Tuberculose, Apr., 1898.

to be of tubercular nature, and it was discovered that there was opportunity for infection of the fish-pond, in which the carp had been placed, with human tuberculosis. Cultures from fragments of these tumors yielded bacilli, which varied from the bacillus of human tuberculosis in only slight details, and when injected into guinea-pigs caused a mild degree of tuberculosis in them. He expresses his belief that the tuberculosis of cold-blooded animals is only a transformation of the tuberculosis of warm-blooded animals, and that human tuberculosis becomes transformed into the other variety when the bacilli grow at ordinary temperature. This latter tuberculosis is in all respects comparable to that form discovered by Velars, and these can cause tuberculosis in guinea-pigs. [The question of the pathogenicity of the bacillus when cultivated under various conditions is one of great importance, and is naturally related to the question of variable virulence of the bacillus in the human being. The following paper is of interest, but is by no means conclusive.] J. Auclair¹ has investigated the question of the **relative virulence of tubercle-bacilli** when taken from various affected organs, such as tubercular glands, tubercular meninges, and chronic phthisical lungs. When injected into guinea-pigs, all these exhibited the same degree of virulence, and he concludes that there is no evidence that human tuberculosis becomes attenuated in the proper sense of the word.

H. Ehret² discusses the subject of **symbiosis in tuberculosis of the lungs**, particularly in diabetic patients. He first refers to the literature regarding double infection in pulmonary phthisis, and then refers to the case of a patient of 36 years, admitted to hospital with advanced diabetes. There were well-developed signs of phthisis, and at the autopsy the lung was found consolidated and riddled with cavities. During life the sputum was examined bacteriologically after careful cleansing of the mouth, and there were discovered various forms of bacteria, especially streptococci, staphylococci, and the tetragenus. Particular attention, however, was awakened by the discovery of a short, plump bacillus with rounded ends. It evidently varied in form considerably, and usually two of the bacilli lay beside one another. It was concluded that this was one of the organisms belonging to the class of pseudodiphtheria-bacilli, and suspicion was entertained that it came from the throat. The greatest care, however, in cleansing the mouth did not prevent its occurrence in the cultures. The same organism was found in three other cases of diabetes with florid phthisis; while in a number of other cases occurring in old persons with very moderate affection of the lungs, no such organisms could be detected. The author is inclined to regard these bacilli as of importance in determining the rapid course of the pulmonary lesions. The occurrence of this particular form of bacterium is probably in a measure determined by the existence of a medium (the pulmonary tissues) containing abundant sugar.

Schnetz³ has investigated the question of mixed infection in pulmonary tuberculosis by making cultures and cover-glass preparations from the sputum of 30 cases of tuberculosis of the lungs. Tubercle-bacilli were found in all cases; in 26 cases there were streptococci; in 22, staphylococci; in 19 cases all three organisms were found together. He was somewhat astonished to find in 18 cases bacilli which in all their characteristics resembled the diphtheria-bacilli. Upon post-mortem examination in a fatal case he discovered the same organisms in the lung. D. Hansemann,⁴ while admitting that tuberculosis is often implanted upon other disease, insists that this occurrence may be often simulated, and among numerous evidences of this fact he records an interesting case in which tubercle-bacilli had been found in the sputum in large numbers,

¹ Arch. de Méd. expér., Nov., 1897.

² Münch. med. Woch., Dec. 28 1897.

³ Berlin. klin. Woch., Apr. 4 and 11, 1898.

⁴ Ibid., Mar. 14, 1898.

and there were signs of cavities in the upper lobes of both lungs. Post-mortem, the cavities were found to be bronchiectatic. One of them contained no bacilli at all, while in the other there were great clumps of bacilli; but the interesting point was that there was no disease of the walls of this cavity, and it simply served the purpose of a culture-tube. [Cases of this sort cannot be admitted without some question. It is unlikely that tubercle-bacilli will multiply in the bronchi without some lesion of the walls of the tubes, and it is easy to overlook a small focus of disease.] Hirschlaff¹ has made some studies upon mixed infection in phthisis, choosing cases in which the course of the fever seemed to indicate such a condition. He took blood from a vein, and in only 4 of 35 cases did he obtain cultures of microorganisms, and these were staphylococci of but slight virulence.

Ribbert² discusses the **origin of acute miliary tuberculosis** in answer to a criticism of Weigert upon the studies of Ribbert's pupil, Wild. He admits that such tuberculosis may be wholly caused by the tubercle-bacilli entering the circulation through penetration of the wall of a vein or lymphatics. He believes, however, that more frequently the quantity of bacilli so admitted would not be sufficient to give rise to a widespread disease, and he contends, therefore, that the bacilli multiply within the circulation. In some individuals this may occur promptly; in others, conditions favorable for their growth develop more slowly.

Benda³ reports an instance of **tuberculosis of the thoracic duct** in an individual who died of acute miliary tuberculosis. The mitral and aortic valves contained an abundance of tubercle-bacilli. They were also numerous in the blood, and there were actual emboli of bacilli in the kidneys. He mentions another case, reported by himself, in which a child had tuberculous coxitis and died of acute miliary dissemination of the disease, and in which there was, at the insertion of one of the chordæ tendinæ of the mitral valve, a yellow nodule which presented the microscopic appearance of tuberculosis, and contained many bacilli. This nodule was ulcerated, and was possibly the source of the terminal dissemination of the disease.

A. N. Péron⁴ has investigated the morbid anatomy of **tuberculous pleurisy**, and finds that the lesions in the early stages are not different from those of simple inflammation, excepting for the presence of the bacillus; and even later, distinct tubercles often do not form.

C. R. Burr⁵ believes that the occurrence of **fatty liver in phthisis** is largely due to inflammatory or degenerative changes occurring in the pneumo-gastric nerves. The left vagus is more intimately related to the liver than is the right; and fatty liver is more common in left-sided phthisis than in that occurring on the right.

Symptomatology.—L. H. Petit⁶ reports a number of cases in which there were distinct evidences of tuberculosis in early life, followed by a period of good health, lasting as long as 30 years in one case. Afterward tuberculosis again broke out and the patients succumbed. The second attack in each case was subsequent to an attack of the grip. All of these individuals were of gouty constitution, and to this he believes was due the intermediate immunity from phthisis.

A. Berthier⁷ insists upon the importance of **hyperesthesia of the pharynx** in the causation of vomiting in phthisical subjects. The sputa in

¹ Deutsch. med. Woch., No. 48, 1897.

² Ibid., Dec. 30, 1897.

³ Deutsch. med. Zeitung, Feb. 7 and 24, 1898.

⁴ Presse méd., Feb. 19, 1898.

⁵ Boston M. and S. Jour., Nov. 25, 1897.

⁶ Rev. de la Tuberculose, Oct., 1897.

⁷ Ibid., Apr., 1898.

their expulsion irritate the sensitive pharynx and give rise to a vomiting-reflex. This is often completely controlled by applications of cocain before eating.

Complications.—C. W. Townsend,¹ after studying the cases of 24 women who bore children while suffering from phthisis, concludes that **conception** may take place even in advanced stages of the disease, and the latter usually improves during pregnancy. Labor is short and easy in proportion to the severity of the disease; but during the puerperium there is speedy advance. Death frequently occurs at this time, and the patient may then present the picture of sepsis. Premature labor is more common the more advanced the disease. The condition of the children at birth is usually as good as that of other new-born children.

A. F. Plieque² calls attention to the occurrence of **uremia** in phthisical cases. It may occur in the comatose, apoplectic form, delirious, or convulsive form, and many of these cases may be difficult to diagnose from cerebral tubercle and from tubercular meningitis. Meningitis is usually excluded by its slower onset, the more localized convulsions, the hydrocephalic cry, the dilated pupils, and the localized paralyses. There is a dyspneic form, which should be suspected when the dyspnea is out of proportion to the pulmonary signs. The uremia may also assume a gastrointestinal form. The most common error is to attribute attacks of uremia to the tuberculosis itself, but there are instances on record in which meningeal tuberculosis in phthisical subjects has been called uremia. Albuminuria arising in phthisis always makes the prognosis much graver, but there is a distinct antagonism to phthisis in cases that have had Bright's disease previously, which is probably explained by the fact that the lungs are somewhat edematous or sclerosed in such individuals.

H. Brun³ studied **thrombosis** in the course of tuberculosis, particularly in regard to its pathogenicity. The condition is frequent in the cachexia of the disease; much rarer in its early course. He knows of but two early cases. It is most common in the veins; next in frequency are the arteries. The changes in the blood in the disease are insufficient in themselves to cause thrombosis. In the majority of cases it is due to localization of microorganisms, tubercle-bacilli, or others along the walls of the vessels. Changes in the vessel-walls and thrombosis readily follow.

T. Heybrechts⁴ gives the record of a man of 47 years, who had **gastro-intestinal tuberculosis** and **renal calculi**. The chief complaint was frequent attacks of pain from gravel, and two attacks of actual nephritic colic, followed by abdominal pain, emaciation, and ascites. A laparotomy showed the presence of generalized tuberculosis of the peritoneum and viscera. The case had a particularly insidious course, and the infection was an obscure one, since there was no hereditary tendency and no disease of the lungs. It is probable that the patient was infected by the ingestion of dust containing tubercle-bacilli.

Diagnosis.—Kelsch⁵ has investigated by **radioscopy** 124 subjects with various affections, in order to determine the value of this method in the detection of tuberculosis. Seventy-three cases gave negative results. In 51 cases abnormal conditions were recognized, most frequently diminution of transparency in the apices, and oftentimes enlargement of the bronchial glands. Opacity of the pleura, more or less general in degree, and diminution in the excursion of the diaphragm were also recognized. Such results are sufficient to be of

¹ Boston M. and S. Jour., Oct. 14, 1897.

² Rev. de la Tuberculose, July and Oct., 1897.

³ Thèse de Paris, 1897.

⁴ Soc. Méd. et Chir. du Brabant, Dec. 28, 1897.

⁵ Bull. de l'Acad. de Méd., Dec. 21, 1897.

important aid in diagnosis. [It is doubtful if this method is sufficiently accurate to justify its general employment.]

P. Parisot¹ insists that the tubercle-bacillus is not of much value in the diagnosis of **tuberculosis in the aged**, as it is comparatively rarely discovered in the sputum. If one wait until the bacillus is discovered in suspicious cases in old patients, he will probably make many errors in diagnosis. He has, with Spillmann, searched for the bacillus in 9 cases of elderly people with tuberculosis, in which the diagnosis was absolutely positive, and in but 3 of these were they able to discover the bacilli.

W. Teichmüller² has studied the **significance of the eosinophile cells** in the sputum, particularly in tuberculous patients. He found these cells present in 103 of 111 sputa from such patients, and thinks their presence is a sign of prognostic value. He believes they indicate the probable presence of incipient tuberculosis, if marked signs are not already present. In severe infection with tuberculosis they cannot usually be found; therefore their absence is of bad omen; but if they reappear, this indicates a probable improvement. [We have found eosinophile cells so commonly in the sputum of all forms of disease, and not rarely in considerable numbers, that we cannot subscribe to the author's views.]

Vetlesen³ has used **potassium iodid in the diagnosis** of phthisis. After exhibition of this drug by the mouth in 27 suspected cases, a reaction was determined in 8. This consisted of onset of cough, or increase if it existed previously, expectoration, and the appearance of râles in that portion of the lung where tuberculosis was suspected. Of the 19 cases which did not react, none have since shown any evidence of tuberculosis.

C. F. Martin and G. D. Robins⁴ have investigated the **diagnostic value of tuberculin**, beginning the dose with $\frac{1}{2}$ mg., and increasing up to 3 mg. In 30 afebrile diseases of various kinds no reaction was obtained; while in 21 cases of certain tuberculosis the reaction was always present. In 2 doubtful cases of pleurisy reaction was noted, and tuberculosis of the lungs subsequently developed. The reaction was absent in 1 case of tuberculosis of the lungs, and in 2 of tubercular disease of the bones. The authors believe that a rise of temperature of 1.5° to 2° F. is a positive reaction. G. G. Sears⁵ has used the tuberculin-test in 10 cases of acute pleurisy, without choosing the cases, with especial suspicion that they were tubercular; 9 gave a positive reaction. He mentions the fact, however, that the explanation of this may perhaps be that the patients had a latent focus of tuberculosis which was really causing no symptoms, and that the pleurisy itself did not give rise to the reaction, but was a coincidence and due to such a supposed latent focus. In Sears's experience (about 40 cases) tuberculin has caused no serious results. He believes it will not do so unless given in doses large enough to cause elevation of temperature. The dose usually should not exceed 1 mg. F. W. White⁶ has given injections of tuberculin to 123 hospital-patients, who were selected because they were afebrile, or nearly so, and whose physical condition remained about constant from day to day. Deep injections in the muscles gave less unpleasant local results than did superficial injections. In the earlier investigations he used 1 or 2 mg., but as this dose seemed insufficient he increased it to 10 mg. There were no bad results from the injections, the worst being a brief attack slightly resembling influenza. Reaction was said to have occurred in those cases in which there was fever of 101° or more with the

¹ Rev. méd. de l'Est, Dec. 1, 1897.

² Lyon méd., Dec. 5, 1897.

³ Boston M. and S. Jour., Aug. 5, 1897.

⁴ Centralbl. f. innere Med., Apr. 2, 1898.

⁵ Brit. Med. Jour., Feb. 5, 1898.

⁶ Ibid.

ordinary febrile symptoms. Of the number injected, 45 were tuberculous, 8 were doubtful, and 70 had no clinical evidence of tuberculosis; 66 reacted. Among the 70 who had no distinct evidence of tuberculosis, 18.5% reacted; so that it seemed probable that cases which are not tuberculous may give a reaction. There were a number of cases, however, in which the reaction was important in the diagnosis, as, for instance, in one that had a negative reaction a supposed tuberculosis of the mesenteric glands proved to be a retroperitoneal sarcoma. White advises against the use of small preliminary doses of tuberculin, since they are likely to produce great tolerance and loss of general reaction. Kasperek¹ has experimented with the old tuberculin, and finds that that prepared from human tuberculosis, when injected into guinea-pigs that have been infected with fowl-tuberculosis, causes a distinct reaction, though it is necessary to employ 8 times the usual dose. In guinea-pigs that were not tuberculous, but had received injections of antituberculous serum, tuberculin provoked a febrile reaction of a different type from that observed in tuberculous animals. W. P. Northrup² has used tuberculin as a diagnostic agent in 61 cases of various afebrile diseases, or such as showed only a moderate fever. In 16 patients supposed to be tuberculous, all reacted to the test; in 19 supposed to be nontuberculous, 1 reacted; in 16 believed to be tuberculous, though not definitely proved so, all reacted. Of 51 of the cases, 84% reacted as was clinically expected; 7 clinically doubtful reacted to the test; 2 patients clinically suspicious did not react; and 1 in whom autopsy showed "a few recent tubercles" failed to react. The author believes that with a better knowledge of the doses and mode of administration this test will prove one of value. A. C. Klebs³ advocates the use of tuberculin in the diagnosis of tuberculosis. Latent tuberculosis may be revealed in persons who are seemingly in good health. He has never seen the reaction in a person in whom tuberculosis could be absolutely excluded.

Sirot⁴ has used **serum of tuberculous persons in the diagnosis** of tuberculosis in human beings. Individuals who had previously no fever showed a rise of temperature after the injections. The advantages of this method over the use of tuberculin consist in its lesser cost and the lack of the serious effects sometimes observed after tuberculin-injections.

Arloing⁵ claims to have been able to observe **agglutination of tubercle-bacilli** by the blood-serum of animals that had been injected with tuberculin or an emulsion of a culture of the bacillus. This was also true of the blood-serum of animals which had been injected with fowl-tuberculin. He says that he also observed this in human beings in 94 of 100 cases of pulmonary tuberculosis, in 91 of 100 cases of surgical tuberculosis, and in 34 cases of tuberculosis of various kinds. In 22 of 100 individuals who seemed in fair health this phenomenon was observed. He thinks that this may be an important sign in diagnosis. Ledoux-Lebard⁶ has investigated the action of a pseudotuberculous serum upon the bacillus of pseudotuberculosis. The serum of infected animals caused distinct agglutination, and the bacilli became arranged in filaments and networks.

J. N. Hall⁷ finds that **systolic interruption of respiration** is most common in fibroid phthisis, especially when this is left-sided. The expiration is interrupted with each heart-beat, and the cause of this is, in his opinion, nar-

¹ Wien. med. Woch., No. 26, 1897.

² Boston M. and S. Jour., Feb. 10, 1898.

³ Soc. des Sci. méd. de la Côte-d'Or., Nov. 5, 1897.

⁴ Quatrième Congrès Franç. de Méd. int., 1898.

⁵ Ann. de l'Inst. Pasteur, Dec., 1897.

⁶ Med. News, Apr. 23, 1898.

⁷ Jour. Am. Med. Assoc., July 17, 1897.

rowing of the blood-vessels by contraction of the lung-tissue. He believes that interrupted respiration may, however, originate in so many different ways that it is not of diagnostic importance, but should arouse suspicion of the existence of a lesion.

T. N. McLean¹ insists on the importance of a slight **cough upon lying down** as a symptom of early tuberculosis of the lungs. He believes the cough occurs owing to the exudate dropping into the bronchi because of the position assumed. He also considers diminution or absence of the normal respiratory murmur of great importance.

C. P. Ambler² thinks that it is advisable for each member of a family with a tuberculous history to undergo **physical examination at least once a year**, in order to discover tuberculosis very early, if it appear. The most valuable sign of early tuberculosis is, in his belief, the discovery of a slight variability of the temperature.

G. E. Papillon³ discusses the early diagnosis of tuberculosis of the lungs, particularly in **chlorotic subjects**. The anemia which occurs in tuberculosis does not have the peculiar yellowish-green tinge of the skin that is seen in chlorosis. There are often old scrofulous signs in tubercular subjects, and they are apt to be thin, contrary to the condition seen in pure chlorosis. The circumference of the chest in phthisical subjects will be less than half their height, while it should be more, and the respiratory capacity, which should be about 3 liters, is usually reduced to two-thirds or one-half of this. The pulse is peculiar in the tubercular, in that change of position does not distinctly influence the rhythm of the pulse, and the sensation communicated to the finger is one resembling that of the Corrigan pulse, and the arterial pressure is apt to be distinctly decreased; this latter is sometimes, however, to be discovered in chlorosis. In tuberculosis the decrease of the red corpuscles is usually nearly or quite proportionate to the decrease in the hemoglobin, while this is not true of chlorosis. [The author's views regarding the condition of the blood in tuberculosis are not sustained by the evidence of other investigators.]

J. A. Gage⁴ believes that tuberculosis frequently causes death in children without being recognized, and believes that the disease is also much more frequent in adults than is commonly believed, certain consolidations of the lung which soon pass off frequently being considered tubercular. He presents the evidence in favor of uterine **transmission of the disease**. As to its transmission in the community, he especially suspects the occurrence of this through the use of tuberculous milk, but rather belittles the danger of infection from dust-laden air. He insists that a case should be considered suspicious or tuberculous if there is slight dulness with some prolongation of expiration and increased resonance, with a low weight and rapid pulse, especially if the family history is suggestive. [It is not unlikely that the author's views may be correct, but more definite proof is required.]

Kernig⁵ has observed 35 cases, all of them patients with severe cachectic disease, in which there was some **dulness over the apices** of the lungs. He explains this phenomenon as due to lessened air-pressure in the apices of the lungs, owing to the muscular weakness and to the decreased respiration resulting from confinement to bed. This observation, he holds, is of importance, since the sign usually disappears when the patients regain health, and it shows that the simple discovery of dulness is not sufficient to indicate actual disease.

¹ Med. Rec., May 14, 1898.

² N. Y. Med. Jour., Feb. 12, 1898.

³ Thèse de Paris, 1898.

⁴ Boston M. and S. Jour., Jan. 6, 1898.

⁵ Zeit. f. klin. Med., Band xxxiv., Hefte 3 and 4.

Leoni¹ diagnosed as **pulmonary hysteria** a case which he observed in a student 19 years of age, who had dulness and subcrepitan râles over the right apex. There were cough, sweats, pain in the chest, slight fever, and hemoptysis, but the symptoms varied in their location and intensity, and disappeared after the use of suggestion, electricity, and hygienic measures. [There do not seem to be any limits to the term hysteria.]

E. G. Janeway² records a number of cases of **syphilis** in which the diagnosis of tuberculosis had been previously made. In one case, in spite of fever, sweating, emaciation, and pain in the side, he made the diagnosis of syphilis by the discovery of disease of two ribs. This case was cured by antisiphilitic treatment. Dinkler³ records a case of syphilis of the lungs and mediastinum which was at first diagnosed phthisis, owing to the presence of cough with profuse expectoration, hemoptysis, night-sweats, and loss of flesh; but after obtaining a syphilitic history and using inunctions of mercury rapid recovery ensued.

T. L. Chadbourne⁴ records an instance of **vicarious menstruation** in a girl 18 years of age. The hemorrhage was from the lungs, and had persisted for 15 months, occurring 9 times within this period. It had caused suspicion of phthisis, but there was no sign of disease of the lungs.

Paschayan⁵ describes the case of a man who had hemoptysis with a dry cough, but without abnormal pulmonary signs. There was a bleeding-point on the left posterior pillar of the pharynx. After several days the patient expectorated a **foreign body** which came from the spot, and which was found to be a wood-louse.

Treatment and Prophylaxis.—The recommendations of the Royal Commission upon Tuberculosis⁶ are: the erection of public slaughter-houses and the inspection of all meat; the prevention of stabling of cattle within 100 feet of any dwelling-house; and the inspection of the stables, together with certain regulations for their sanitary condition. The danger of infection from meat has, however, in the opinion of the commission, been overrated, but the danger from milk is far greater. The cooking of the meat destroys the bacilli, and all milk should be boiled, and should be investigated from time to time by public inspectors. Notice of disease of the udder should be communicated to health authorities; and tuberculin should be prepared by the health authorities and owners encouraged to test their animals. Inspectors should be appointed only after they have specially prepared themselves for their work and have shown their capability by passing a special examination.

Grancher⁷ renders a complete and valuable report on prophylaxis in tuberculosis. The most important of his conclusions are: that the sputa should invariably be collected in a vessel containing a 5% solution of carbolic acid; that servants should avoid stirring up dust by wiping objects with a damp cloth instead of sweeping; that milk should be boiled before drinking; all cases should be reported, and, if possible, the tuberculous subject should be removed early from the family and treatment at once undertaken in an institution. If the patient is unwilling to conform to rules laid down, it should be legal to force him to enter an institution. The apartments of tuberculous subjects should be disinfected after their departure, and, if possible, floors should be relaid and sweeping should be stopped. There should be a sanatory corps to look after tuberculous subjects, and all flesh should be inspected, and, if

¹ Morgagni, June, 1897.

² Münch. med. Woch., No. 47, 1897.

³ Méd. mod., Aug. 25, 1897.

⁴ Report of the British Royal Commission upon Tuberculosis, 1898.

⁵ Bull. de l'Acad. de Méd., May 3, 1898.

⁶ Maryland Med. Jour., May 21, 1898.

⁷ Jour. Am. Med. Assoc., Jan. 22, 1898.

necessary, animals should be killed or destroyed if they are infected with tuberculosis.

M. Holmboe and Kraus Nanssen¹ have presented a report concerning the **public control** of tuberculous patients in the Scandinavian Peninsula. They recommend that all cases should be reported; should be regularly seen by a health officer; should be required to use spit-cups; and if they do not conform to regulations, should be required to go to institutions. After death or removal of a tuberculous patient his apartments and belongings should be disinfected. No tuberculous patients should be allowed to prepare food for others, and fines should be imposed upon physicians who neglect to report cases. Extensive sanatoria should be provided for care of the cases. [Unfortunately, these suggestions cannot be enforced. Writers should confine themselves to practicable suggestions.]

F. E. Waxham² believes that compulsory isolation of cases of phthisis is barbarous. He thinks that all **cases should be registered**, and should be required to use spit-cups; that all rooms occupied by tuberculous patients should be disinfected before being used by others; and that the use of the general communion-cup should be interdicted. Tuberculous subjects should not be received in general hospitals or dispensaries, and there should be special hospitals erected for their care. When they are in the active stage of the disease marriage should be prohibited. [Doubtless these regulations are desirable, but they cannot be enforced.] N. S. Davis³ states his belief that the public declaration that tuberculosis is a contagious disease and compulsory reporting of the disease would prevent large numbers of sufferers from consulting a physician, for fear that they would be reported. It would also largely add to their anxiety and to their difficulties in securing employment. P. H. Bryce⁴ believes that no great results will be seen from public control of tuberculous cases until we have suitable sanatoria for their treatment. He contends that the present necessity is to provide such sanatoria, and then institute State-regulation of the disease as far as expediency may determine advisable.

S. A. Knopf⁵ insists upon the necessity for either **disinfecting passenger- or sleeping-cars** that have been occupied by tuberculous cases, or the insistence upon railroads running ambulance-trains for such cases. He describes a pocket-flask for the reception of tuberculous sputa, which he has modified from Dettweiler's. The flask is not patented.

Noel,⁶ in order to control the increase of **tuberculosis in the army**, advises increased severity in the examination of recruits and the rejection of suspicious subjects. He thinks that radioscopy should be employed if any suspicion exists of involvement of the lung.

S. A. Knopf⁷ strongly commends the use of **air-baths** and **sun-baths**, together with **hydrotherapy**, to improve the condition of children that show any tendency to phthisis, and the same treatment is recommended for phthisical adults, used in combination with gymnastics to increase chest-expansion and muscular development.

E. Lepelletier⁸ contends that **retronasal irrigations** are of the greatest importance in the prophylaxis and treatment of pulmonary tuberculosis, since the nose and the nasopharynx are the cavities which first receive the micro-organisms, and are frequently infected after acute or chronic inflammation has rendered them more subject to invasion.

¹ Rev. de la Tuberculose, July, 1897.

² Jour. Am. Med. Assoc., Oct. 23, 1897.

³ Jour. Am. Med. Assoc., Oct. 30, 1897.

⁴ N. Y. Med. Jour., July 24, 1897.

⁵ N. Am. Pract., Nov., 1897.

⁶ Canad. Pract., Jan., 1898.

⁷ Bull. méd., Dec. 8, 1897.

⁸ Thèse de Paris.

Sanitarium Treatment.—F. Quintin¹ believes that the **requisites for a good health-resort** are: a location with a low death-rate and in which tuberculosis is rare; a sparse population; and a site on a plateau. The buildings should face the south and be protected from severe winds; the humidity of the air should be medium; the winters mild; and there should be but little cloudy weather. J. A. Lindsay² discusses the treatment of phthisis by the sanatorium-method. To encourage a belief that phthisis is largely a curable disease and one that may be stamped out, he points out that the mortality per million inhabitants in England and Wales has decreased over 20% in 20 years, and is still decreasing. S. A. Knopf³ suggests that all large cities should provide sanatoria for consumptives. There should be a centrally located reception-hospital, from which the patients should be sent to a slightly elevated sanatorium in the outskirts of the city when they are sufficiently improved. From here they should go to a mountain-sanatorium. He believes that more can be accomplished in properly arranged sanatoria than by sending patients to distant elevated regions.

Karl Hess⁴ gives a description of the **Falkenstein sanatorium** for phthical patients. The important feature of the treatment is fresh air. All patients who are able are obliged to be out in the air the whole day long, while weaker patients are kept on the porches, or near windows in thoroughly ventilated rooms. Early cases with fever are kept in bed, while chronic fever-cases are kept at rest but in the open air. The lung-condition improves under this treatment, and especially does the appetite increase, while the night-sweats decrease. There are protected promenades, which allow the patients to be out even in bad weather. Milk is always used in diet, and if properly taken they find that there are practically no cases with which it disagrees. Alcohol is used, excepting in those cases with hemorrhage, and the skin is especially looked after by giving baths, douches, etc. Medicinal treatment is only symptomatic. For hemorrhages, Hess recommends the use of Assalini's bandages. The larynx and pharynx should be especially looked after. All articles belonging to patients, and the furniture of their rooms, are always disinfected after they leave. Dettweiler's sputum-bottles are required to be used during the patient's stay in the institution; spoons and forks are disinfected after each meal; and in all other ways there is an endeavor absolutely to prevent infection. The average for the past few years has been 15% of cures, with nearly as many comparative recoveries, and many cases are sent there only shortly before death.

F. W. Burton-Fanning⁵ describes the methods in use in the treatment of tuberculous patients at **Cromer**. The important part of the treatment consists in having the patients remain in the open air all the time during sunlight, unless they have a good deal of fever. They are protected from winds by shelters and are warmly wrapped. On rainy days they stay within doors. He reports the results from this treatment, and says that both the physicians conducting the home and the patients are greatly in favor of its continuation.

S. G. Bonney⁶ presents the results of his observation of 200 cases of consumption seen in **Colorado**. Sixty-nine improved, and 16½% showed entire arrest of the tuberculous process. Of the 62 cases which did not improve, 11 had complications or indulged in imprudences. Those of Irish or Swedish extraction seemed to show a special predisposition. He saw no unfavorable results upon functional nervous disorders, and early hemorrhagic cases seemed well

¹ Jour. d'Hygiène, Sept. 30, 1897.

² Med. Rec., Nov. 7, 1897.

³ Lancet, Mar. 5, 1898.

⁴ Lancet, Dec. 4, 1897.

⁵ Practitioner, 2, 1897.

⁶ Boston M. and S. Jour., Sept. 16, 1897.

sued by the climate. He believes that the only cases unfavorably influenced are those that have very extensive disease or enfeebled cardiac power, well-marked sepsis, or are unable to provide the necessities of life. He thinks all cases should remain permanently in Colorado. [There is a quite general belief among physicians that neurotic persons do not bear high altitudes as well as others. The author's experience seems to be at variance with this opinion. The advice that tuberculous persons remain permanently in the climate that proves satisfactory is undoubtedly judicious.]

F. M. Sandwich¹ advances the claims of **desert-climates as resorts** for tuberculous subjects. Such places have warmth and sunlight, little rain, plenty of ozone, and germs are absent; but while life on the desert is valuable for the tuberculous patient, one must be wealthy in order to be comfortable. The greatest objection to the Egyptian climate is the prevalence of wind; but the author recommends Egypt as a resort for all cases excepting those with a marked tendency to fever, diarrhea, acute attacks of pleurisy, or to rapid disease of both lungs.

H. J. Campbell² insists upon the supreme **importance of rest** in the treatment of phthisis, particularly in acute cases. It is especially important to keep the affected side at rest, and the necessity for this is shown in those cases associated with a pleural effusion. One very frequently sees in these instances that the tuberculous makes little or no advance so long as the effusion is undisturbed, but there is rapid downward progress in many cases after tapping. He instances a case from his own practice in which a rapidly progressing acute phthisis was entirely cured by a treatment which consisted almost exclusively of rest.

E. A. de Schweinitz³ records his experience in producing an **antitoxic serum for tuberculosis**. Serum from cows treated with tuberculin caused slight resistance in guinea-pigs to injection of tubercle-bacilli. A serum prepared from horses which had been treated with attenuated cultures preserved 2 guinea-pigs which had been injected with bacilli. Hence injection of cultures seemed to be more useful than injections of tuberculin, but no definite, practical results can be said to have been attained.

E. L. Trudeau⁴ has made a series of experiments on the development of **artificial immunity from tuberculosis**. In 1894 he reported that the subcutaneous inoculation of avian tubercle-bacilli caused increased resistance of the rabbit to infection with virulent mammalian cultures. He has also obtained marked success by protecting guinea-pigs with cultures of mammalian bacilli attenuated by prolonged cultivation. In his guinea-pig experiments he found that the average duration of life in 36 unprotected animals was 57.2 days after inoculation with tubercle-bacilli, while in 66 vaccinated animals it was 104.3 days. The immunity seems to increase rather than diminish with time. [These investigations are suggestive, and when considered in connection with recent experiments at cultivation of tubercle-bacilli at low temperatures, may throw some light upon the relations of animal and human tuberculosis. The following abstract also bears upon the same question.]

Fowl-tuberculosis.—P. Paterson⁵ records an instance in which a number of persons in the family of a poulterer whose fowls had tuberculosis, themselves acquired tuberculosis. This led Paterson to experiment on immunity against mammalian tuberculosis by using a serum prepared by using the bacillus of fowl-tuberculosis. He found that injection into rabbits of the bacilli causing

¹ Practitioner, No. 9, June, 1898.

² Jour. Am. Med. Assoc., July 17, 1897.

³ Brit. Med. Jour., Nov. 13, 1897.

⁴ Brit. Med. Jour., Dec. 25, 1897.

⁵ Lancet, Oct. 30, 1897.

the disease in fowls, followed by injection of mammalian tubercle, resulted in but limited disease, never becoming general. A serum prepared from fowls likewise caused in rabbits and guinea-pigs limitation of previously existing experimental mammalian tuberculosis, local tuberculosis only being developed. Preliminary injection of this serum caused the same limitation in a subsequent experimental inoculation of tuberculosis. Paterson believes from this that a serum may be produced from tuberculous fowl which will render human beings at least temporarily immune to the mammalian disease.

Tuberculin R of Koch.—[Numerous contributions treat of the advantages and disadvantages of this method of treatment. A review of the following citations will show that the newer tuberculin is even less safe than the older, and there is little to indicate any advantages.] V. Ziemssen¹ believes that Koch's "tuberculin R" and Maragliano's serum are of no value in the treatment of tuberculosis. He thinks that there are distinct disadvantages in the treatment of tuberculosis by altitude, and considers that the best method is the use of local sanatoria constructed for all classes of society. [The author's opinion is worthy the greatest respect, but is surely not borne out by the experience of American physicians, as far as his reference to altitude is concerned.]

V. Nencki, v. Maczewski, and v. Lignecke² found several varieties of pathogenic cocci, as well as moulds and yeasts, and in two samples tubercle-bacilli, in the tuberculin R. Trudeau and Baldwin³ also found yeasts and tubercle-bacilli, as did Jez⁴ and Schröder;⁵ and Huber⁶ has found tubercle-bacilli that killed guinea-pigs, and were, therefore, certainly virulent. Huber also found that he could not immunize guinea-pigs to tuberculosis with the preparation. Jez⁷ insists that tuberculin R does not cause immunity, and reports a case of lupus which relapsed during treatment. Schulz⁸ has seen tuberculous laryngitis arise during the treatment, and Jarvein⁹ reports acute-miliary tuberculosis during treatment, and arising from entirely localized disease. E. Klebs¹⁰ states that he has discovered a method of eliminating the danger of including impurities in preparing tuberculin R. After adding magnesium carbonate he centrifugates the fluid, and finds that all the gelatinous matter and tubercle-bacilli are found in the magnesium precipitate.

V. Kernig¹¹ condemns the treatment energetically, and reports a number of cases which showed rapid advance and soon resulted fatally under its use. G. Schröder¹² has also had unfavorable results in cases apparently well suited to the treatment. In the discussion at Moscow, Senator added his testimony against the treatment; and Gerhardt stated his belief that it should at most be used only upon the request of the patient. [This last statement is remarkable, to say the least. Either the treatment is advisable or it is not.] Burghardt¹³ has seen only negative or bad results. Parges¹⁴ has seen lupus grow worse after temporary improvement, and Stempel was obliged to omit the treatment in 4 cases of the 23 that he treated, owing to the severe reaction and general depression of health, though other cases showed improvement. Bukovsky¹⁵ and Schnabel¹⁶ have both seen very unfavorable influence upon the general health, with marked loss of weight, and both speak strongly against its use. Rande,¹⁷

¹ Münch. med. Woch., Jan. 4, 1889.

² Med. News, Aug. 28, 1897.

³ Münch. med. Woch., July 20, 1897.

⁴ Loc. cit.

⁵ Proc. Internat. Med. Congress, Moscow, 1897.

⁶ Proc. Internat. Med. Congress, Moscow, 1897; Arch. russes de path. de Méd. Chir. et de Bacteriol., vol. v., fasc. 1; St. Petersburg. med. Woch., Feb. 14, 1898.

⁷ Münch. med. Woch., July 20, 1897.

⁸ Wien. klin. Woch., Apr. 14, 1898.

⁹ Centraltbl. f. d. gesamte Therap., Oct., 1897.

² Presse méd., No. 46, 1897.

⁴ Wien. med. Woch., 1897.

⁶ Berlin. klin. Woch., Feb. 14, 1898.

⁸ Deutsch. med. Woch., July 8, 1898.

¹⁰ Jour. Am. Med. Assoc., July 3, 1897.

¹² Feb. 14, 1898.

¹³ Berlin. klin. Woch., Feb. 14, 1898.

¹⁵ Wien. med. Woch., Oct. 2, 1897.

¹⁷ Berlin. klin. Woch., Feb. 14, 1898.

while he has seen marked improvement in 2 cases of phthisis and entire recovery in a case of local tuberculosis of the stump of the arm, also observed rapid advance of the disease and early death in a third case of phthisis. Huber¹ and Hewes² have seen variable results, with neither markedly favorable nor distinctly unfavorable effects.

Doutrelepon³ and Reinhold⁴ have observed albuminuria after the injections.

Stempel⁵ and Leick⁶ have seen eruptions of urticaria. Almost all observers have seen marked temperature-reaction, and often marked malaise, headache, and pain in the back and extremities. Doutrelepon has seen severe reaction after a dose of but $\frac{2}{5}$ mg. Dauriac⁷ is almost alone in that he has but once seen fever, even though he has given about 2000 injections; but he has had repeated complaints of malaise and insomnia. Reinhold, Jez, Doutrelepon, Senator, Bussenius,⁸ Van Hoorn,⁹ Wörner,¹⁰ and Baudoch¹¹ have all found that the reaction varied with the specimen of tuberculin R used. Kaatzer¹² thinks a variable reaction may be due to the varying idiosyncrasies of the individual. Local reaction is but rarely reported, though Senator and Rumpf have noted abscesses.

A. Spiegel¹³ finds that **massage** after the use of tuberculin R will prevent infiltration and pain. He has used the treatment in 21 cases, but in only 8 was it fully carried out. Of these, 6 improved, 1 was unimproved, and 1 became worse. In the cases improved the author believes that the good results were due solely to better hygienic influences. [There is a general agreement that the reaction of 0.5° C., which Koch described as the greatest that is to be expected, is much less than what is commonly seen, and that it is usually impossible to increase the dose, as Koch advised, to 20 mg., a notable exception being one case of Bussenius,¹⁴ in which he finally reached a dose of 40 mg.]

Spengler¹⁵ records favorable results in a considerable series of cases of phthisis, and strongly recommends the treatment, while Stempel, Peters,¹⁶ Rembold,¹⁷ Dehio,¹⁸ and Bosquier,¹⁹ also report quite extensive experience, with entirely favorable effects. E. G. Cutler²⁰ and C. D. Nelson²¹ each record 2 cases with improvement, as does F. M. Sandwith,²² though the records of the last-mentioned cases leave the results at least in doubt. Maragliano²³ thinks the new tuberculin more valuable than the old, because the reaction is less, but considers it otherwise of much the same effect. Letulle²⁴ is unable to reach a definite decision as to its value, since he has seen good results follow its use, but in one case hemoptysis resulted. Bussenius and Cassmann,²⁵ after a study of the results of treatment of 34 cases of tuberculosis involving various organs, decide that there is no danger in its use, and that it cures many cases of phthisis, though it is only to be recommended in early, non-febrile cases, and should be stopped if the patient grows

¹ Berlin, klin. Woch., Feb. 14, 1898.

² Deutsch. med. Woch., Aug. 19, 1897.

³ Loc. cit.

⁴ Progrès méd., Dec. 4 and 11, 1897.

⁵ Ibid., No. 35.

⁶ Ibid., No. 34.

⁷ Münch. med. Woch., Dec. 21, 1897.

⁸ Ibid., Sept. 22, 1897.

⁹ Zeit. f. Hyg. u. Infectiönskr., Dec., 1897.

¹⁰ Thèse de Paris, 1898.

¹¹ Ibid., June 23, 1898.

¹² Gaz. degli Osped. e delle Clin., No. 81, 1897.

¹³ Boston M. and S. Jour., Sept. 9, 1897.

¹⁴ Münch. med. Woch., May 31, 1898.

¹⁵ Deutsch. med. Woch., No. 34, 1897.

¹⁶ Deutsch. med. Woch., No. 28, 1897.

¹⁷ Ibid., No. 30.

¹⁸ Ibid., No. 35.

¹⁹ Deutsch. med. Woch., No. 28, 1897.

²⁰ Münch. med. Woch., No. 45, 1897.

²¹ Proc. Internat. Med. Cong., 1897.

²² Boston M. and S. Jour., Dec. 2, 1897.

²³ Lancet, Sept. 4, 1897.

²⁴ Soc. méd. des Hôp., Nov. 5, 1897.

²⁵ Das Tuberculin R, 1898.

worse. They urge its use in lupus, but Bussenius¹ later mentioned in discussion that 2 of the 3 cases that he had presented 7 months before had active recurrences; and Bieck,² speaking from his experience, insisted that one is in danger of wasting valuable time in using it in operable cases.

Gerber and Prang,³ Van Hoorn,⁴ Wörner,⁵ Dauriac,⁶ and Doutrelepon have, however, seen good results in lupus, while Petruschky⁷ highly recommends the treatment for both lupus and tuberculous adenitis. Seligmann⁸ saw astonishingly good results, with final cure, follow its use in a case of tuberculosis of the skin and genital organs. R. Muller⁹ used tuberculin R in 2 cases of otitis media of tubercular character, and saw an acute eruption of miliary tubercles on the drum-membrane in one case. Slawyk¹⁰ has used the treatment in children, and since he saw violent reaction in one case decides that the dose should be very small if the preparation is used in children.

J. McFarland¹¹ concludes from his experiments that **antituberculin** will not cure existing tuberculosis in guinea-pigs, nor will it, given previous to injection, prevent the development of tuberculosis. He records notes of a series of cases treated for him by a number of clinicians, and concludes that antituberculin is clinically of value in the treatment of tuberculosis; and that it seems to ameliorate certain symptoms, though he does not express any stronger opinion. Of 15 cases, the result was negative in 5, 2 cases died, and 3 grew worse, while the others seem to have shown marked improvement. He insists that results with guinea-pigs cannot be used as absolute criteria in indicating treatment for human beings, and insists that this is often shown by the variations between experimental and clinical results. [The author is becomingly judicious in his expressions regarding the practical usefulness of the remedy. Unfortunately, many writers express positive opinions based upon meager clinical experience and upon uncertain data, such as the amount of expectoration, the apparent number of bacilli in the sputum, etc.]

J. E. Stubbert¹² gives a report of 200 cases of consumption recently treated at the **Loomis Sanitarium**. He has used ichthyol, with a good deal of success. The same is true of hot-air inhalations. Antitubercle-serum, furnished by the Biochemical Laboratory of Washington, was used in 34 cases, with strikingly good results. All but a few of the cases showed marked improvement in the physical signs, expectoration, cough, appetite, and weight; while in more than one-half the temperature improved, and in many the bacilli decreased or disappeared. The X-rays have been found valuable in diagnosis.

Guy Hinsdale¹³ reports a case of well-advanced phthisis in which injection of antitubercle-serum, obtained from a donkey, was followed by great improvement, with entire disappearance of tubercle-bacilli from the sputum, though the treatment was incomplete.

J. T. Whittaker¹⁴ still uses **Koch's old tuberculin**, and has had useful results from it in private practice as a therapeutic measure. He considers it, however, chiefly valuable in diagnosis.

Fasano¹⁵ has used the **serum of Maragliano** in numerous cases, and has noticed no ill-effect, excepting, occasionally, cutaneous eruptions, which disap-

¹ Berlin. klin. Woch., Mar. 21, 1898.

² Deutsch. med. Woch., No. 39, 1897.

³ Ibid., No. 30.

⁴ Deutsch. med. Woch., Nos. 39 and 40, 1897.

⁵ Ibid., No. 34.

⁶ Jour. Am. Med. Assoc., Aug. 21, 1897.

⁷ Tr. Assoc. Am. Physicians, 1897.

⁸ Ibid.

⁹ Ibid.

¹⁰ Progrès méd., Dec. 4 and 11, 1897.

¹¹ Ibid., No. 30, 1897.

¹² Ibid., No. 30.

¹³ Phila. Med. Jour., Mar. 12, 1898.

¹⁴ Jour. Am. Med. Assoc., Nov. 6, 1897.

¹⁵ Arch. internat. di Med. e Chir., xii, fasc. 7.

peared rapidly, and slight enlargement of the glands near the site of the injection. The favorable results were depression of the temperature; increase in weight, strength, and appetite; diminution of the frequency of the pulse and respiration and of the quantity of the expectoration. Raimondi and Moscucci¹ have treated 15 cases of phthisis with Maragliano's serum. Five of these cases had circumscribed lesions, with slight illness and little fever; 10 had cavities, with night-sweats and high temperature. There was no definite and complete cure, but 4 cases showed persistent improvement, 6 seemed improved, and 3 were unimproved. The serum caused the fever and night-sweats to lessen or disappear. The bacilli in the sputum diminished in numbers, and the general strength and body-weight improved rapidly. There were no untoward results. The dose at the beginning was 1 c.c., gradually increased up to 30 c.c., and in 2 cases up to 100 c.c. B. Francesce² has used Maragliano's serum in patients who had no lesion of the lung, but had enlarged lymphatic glands or phlyctenular ophthalmia, giving the injections into the glands or under the conjunctivæ. The glands diminished in size and the phlyctenule disappeared, and no new ones appeared in their place. Hager³ has used Maragliano's serum with favorable results, both in pulmonary tuberculosis and, locally applied, in lupus.

Karl von Ruck⁴ states that he has prepared a watery **extract of dead tubercle-bacilli**, with which he has been able to produce in guinea-pigs a certain amount of immunity to tuberculosis, and that his solution is nontoxic as contrasted with Koch's solution, which he finds is very toxic. He protests against the use of Koch's tuberculin until it has been proved that the substance itself does not contain tubercle-bacilli which are virulent, and calls attention to the fact that the patient may be rendered temporarily immune with tuberculin; but if bacilli are introduced at the same time and cause only local effects, they may cause general tuberculosis after the immunity has passed away.

P. Paquin⁵ reports 67 additional cases treated with **antitubercle-serum**. Among these there seemed to be 17 complete recoveries, 35 were considerably improved, and 4 died. In all, this makes 293 cases which he has reported, of which 57 have recovered, 37 have died, and the others seemed somewhat improved. He does not believe that the treatment will be of much use, excepting during the early stages. L. B. Edwards⁶ has used Paquin's antitubercle-serum in a series of cases of tuberculosis of the lungs which seemed hopeless. During treatment 5 died, while 11 seemed to have practically recovered. D. Rochester⁷ reports a number of cases of tuberculosis, of which some were treated by aseptonin without any definite results, though 2 improved slightly. A second series was treated with Paquin's antitoxin. The results in these cases were not marked, and the remedy caused severe suffering. The third series, treated with nuclein, seemed to show some improvement, and the fever was well controlled.

J. O. Hirschfelder⁸ describes his **method of producing tuberculin**, which consists in sterilizing the flask containing a culture after the serum has begun to sink, and adding to the filtrate of this one-tenth its quantity of a 10-volume solution of hydrogen peroxid, adding the same quantity of peroxid 9 subsequent times, so that in all it equals the amount of filtrate used. He has used this oxytuberculin in 4 cases of phthisis in the first stage, all of which were cured; in 9 cases in the second stage, of which 4 were cured and 5

¹ Arch. Italiano Clin. di Med., Oct. 15, 1897.

² Münch. med. Woch., Aug. 3, 1897.

³ Jour. Am. Med. Assoc., July 17, 1897.

⁴ Jour. Am. Med. Assoc., July 10, 1897.

⁵ Riforma Med., June 28, 1897.

⁶ New Orl. M. and S. Jour., July, 1897.

⁷ Med. Rec., Apr. 9, 1898.

⁸ Med. News, July 3, 1897.

improved; in 25 in the third stage, of which 2 were cured, 18 much improved, 2 slightly improved, and 3 unimproved; 11 in the fourth stage were treated, with 1 cure, 5 marked improvements, and 1 slight improvement, while 1 remained unimproved.

C. R. P. Fisher¹ has used **antiphthisin** in 6 cases of consumption: 3 were improved, 2 seemed cured, while 1 died. F. E. Waxham and T. R. Fisch² record their results in the treatment of 10 cases of chronic tuberculosis with antiphthisic serum, and decide that in such cases it does not either cure the disease nor cause the bacilli to disappear, but may cause some temporary improvement. C. C. Browning³ has treated 10 patients with tubercle-antitoxin, with the result that 2 died, 4 recovered, and 4 are under treatment, the latter being improved. J. K. Leman⁴ has treated cases of phthisis with the various forms of antitubercle-serum. Of the 31 cases which he records, 8 were in the first stage; 1 of these died of hemorrhage, 5 are well, and 2 improved. Of 8 in the second stage, there were 3 recoveries and 2 deaths reported. Of 15 in the third stage, all died. He thinks the results are rather more permanent than with other methods, but does not think the serum distinctly better than climatic and hygienic treatment.

F. Brunet⁵ has investigated the therapeutic effect of **extract of lung** in guinea-pigs experimentally infected with tuberculosis, and found that it prolongs life for about a month beyond the life of guinea-pigs similarly infected but not receiving this treatment. He has also used this treatment in 4 tuberculous patients, and found that their cough was somewhat diminished and the other symptoms slightly improved. There is no definite evidence that pulmonary extract has an actual therapeutic effect, but it seems that it may be useful in the treatment of phthisis. Grande⁶ reports his experiments in the use of a powder prepared from lungs in guinea-pigs which had been inoculated with tuberculous sputum, and in 1 man who was ill with tuberculosis. The 2 guinea-pigs to which the lung-preparation had been administered survived, while a control-animal died in 33 days. The patient to whom lung-powder was given showed continuous improvement for 5 months and gained 14 pounds in weight. Arnozan⁷ has used extract of lung in 6 cases with purulent pleurisy or mediastinal abscess which were believed to be nontubercular. All these cases improved after they had resisted other medication.

Cassaet, in discussion, stated that he had observed unpleasant results from extract of lung, such as erythema and hemoptysis. Sometimes insomnia occurred, or considerable excitement, fever, and rapidity of the pulse, followed by symptoms somewhat resembling thyroid poisoning. In tubercular cases he had observed improvement in the general health after its use, without any change in the local signs. In chronic pleuropulmonary septicemia, with beginning hypertrophic osteoarthropathy, its action was most marked, causing all the unfavorable symptoms to decrease and resulting in marked improvement; but it should not be employed during a long time.

F. P. Kinnicut⁸ states that he has used **thyroid gland** in a large number of cases of phthisis without seeing any effect upon either the local signs or the general condition of the patients. He has administered **thymus-extract** in 6 cases of phthisis without fever. In these cases also the local signs and general condition remained unaffected; and while there was a temporary increase in weight, this was followed by a loss.

¹ Therap. Gaz., Apr. 15, 1898.

² Jour. Am. Med. Assoc., Mar. 19, 1898.

³ Med. Rec., Nov. 27, 1897.

⁴ N. Y. Med. Jour., May 14, 1898.

⁵ Gaz. hebdom. de Méd. et de Chir., p. 301, 1897.

⁶ Riforma Med., No. 33, 1897.

⁷ Quatrième Congrès Franç. de Méd. int., 1898.

⁸ Am. Jour. Med. Sci., July, 1897.

J. Heusser¹ has employed **cinnamic acid** in the treatment of tuberculosis, and in 6 cases he believes he accomplished complete cure. He prefers and used in all 6 cases injections into the gluteal muscles, beginning with $\frac{1}{2}$ minim of a 5% emulsion, increasing until a dose of 15 minims was reached. Beyond some burning sensation at the site of injection and temporary languor no unfavorable results were noticed.

Bergonié and Mongour² report the effects of treatment of 5 cases of tuberculosis with **X-rays**. In 2 cases of acute phthisis associated with alcoholism and privation there was no effect of the treatment. Of 3 cases of chronic tuberculosis, the result was negative in 1, while there was distinct amelioration in 2. The general condition, the appetite, and the local lesions all seemed to improve—in 1 case for a month and a half, after which there was an increase in symptoms, which was due to dyspeptic trouble. The bacillus was not modified either in numbers or form, so that the authors believe that while they can answer affirmatively the question whether tuberculosis is improved by the X-rays, still there does not seem to be any distinct specific effect. There may, however, be an increase in phagocytosis.

Franke³ reports a case of tuberculosis with **cavity-formation** in the apex, in which the pleura was adherent. The lung was incised with a thermocautery and the cavity, the size of an egg, opened and drained. The secretion, at first free, was afterward diminished, and 6 months after operation the sputum contained no tubercle-bacilli; 8 months after operation the patient died of influenza.

M. Bloch⁴ has treated 30 cases of tuberculosis by applying a plaster-cast to the diseased side of the chest, in order to cause **immobilization**. The cough decreased, other symptoms improved, and, if the cast was allowed to stay on for 2 or 3 weeks, a marked decrease in the râles was found after its removal.

Jacoby,⁵ in the treatment of tuberculosis of the lung, produces an **artificial hyperemia** of the apices by applying a special rubber-jacket, through which streams of water are passed, the shock of the water against the chest producing hyperemia. In cases so treated he has found much improvement. [We are by no means convinced that the method of treatment suggested secures the hyperemia intended. Experimental and clinical evidence does undoubtedly indicate that hyperemia makes tissues unfavorable to the extension of tuberculous disease; but it is difficult to see how a local hyperemia is to be secured in the lungs.] C. W. Ingraham⁶ has had prepared a solution containing iodine, bromine, phosphorus, thymol, and menthol, which can be given hypodermically in the treatment of tuberculosis. It has no evil local effects, and he claims uniform improvement from its use.

[The usual number of contributions advocating the use of one or another remedy have appeared during the year. Nothing of lasting value has, however, been added to therapeutic knowledge. The advocates of organotherapy have, with more zeal than reason employed various animal extracts, and reference is made in the succeeding paragraphs to some of the reports.]

William Murrell⁷ uses **calcium chlorid** in large doses in tuberculosis, in the hope of aiding calcification. This treatment is combined with the phosphate of lime to replace the loss of phosphates, and with hypophosphite of lime in large doses. When there is suppuration he also uses calcium sulphid.

¹ Therap. Monatsh., Sept., 1897.

² Bull. de l'Acad. de Méd., Paris, July 13, 1897.

³ Mittheil. aus dem Grenzgeb. d. Med. u. d. Chir., vol. i., p. 688, 1898.

⁴ Tribune méd., May 4, 1898.

⁵ Méd. mod., Sept. 22, 1897.

⁶ N. Y. Med. Jour., Oct. 23, 1897.

⁷ Med. Brief, July, 1897.

L. F. Flick¹ has treated 102 cases of tuberculosis with **iodoform- or euophen-inunctions**, and he believes that incipient cases almost always can be cured in this way, and that advanced cases can be improved.

Héricourt and C. Richet² have treated cats, that had been infected with tuberculosis, by **injecting iodin-water** into the trachea, using a solution of the strength of 2:1000, and commonly using 250 c.c. at an injection. The lives of the animals were prolonged, but the tuberculosis was not arrested.

A. Z. Cipriani³ recommends **chinosol** in cases of tuberculosis either of the lungs, bones, or glands, giving it by the mouth or by injection; in the former case in doses of 1 gm. a day. This has given him good results.

Brantonne⁴ has had favorable results with the use of **ichthyol** in phthisis, using it in an alcoholic solution containing 2 drams of ichthyol and 6 drams of alcohol, beginning with 30 drops *t. i. d.*, and increasing until 150 drops are given *t. i. d.* He thinks that the action is like that of creosote, but is without the unpleasant collateral effects of the latter.

Goldmann, Hoell, and Dakura⁵ have used **guaiacetin** in the treatment of tuberculosis, giving from $\frac{1}{2}$ to 1 gm. repeatedly in the day. It caused no irritation, and was well borne, causing energetic antipyretic effect. The nocturnal sweats and the cough diminished, the appetite improved, and the weight increased; but they do not consider the drug a specific, and believe that it is only able to cause an amelioration of the symptoms. It is less disagreeable and more readily borne than its congeners. J. Dakura⁶ has used guaiacetin in the treatment of 22 cases of tuberculosis, and finds it does not disturb digestion and is as effective as guaiacol, creosote, etc., and while it has no specific effect upon the disease it does improve the symptoms. J. A. Goldmann⁷ has treated 26 cases of phthisis with guaiacetin and eucasin, with the result that all the symptoms were improved. Three cases of severe advanced phthisis showed marked betterment. W. Gemünd⁸ has investigated the bactericidal power of the blood of animals both before and after guaiacetin has been administered, and found that while in one animal the bactericidal power seemed increased, in others the experiment was entirely negative, so that no definite conclusion could be reached.

J. E. Squire⁹ has used **guaiacol** very freely in the treatment of phthisis, giving as much as 60 minims 3 times a day. He found that it lessened cough and fever, and caused increase in weight when well borne. G. Mourange¹⁰ compares the results of treatment of tuberculosis by the older methods and those following his more recent treatment, in which guaiacol and tannin are the chief medicaments used. Of the 21 who have been on this treatment in the past 3 years, 8 seemed entirely recovered and 10 are much improved. In connection with this treatment the open-air cure was employed. The contraindications to injections of guaiacol which he mentions are hemoptysis, excessive dyspnea, high fever, and albuminuria, or severe cardiac lesions. He draws attention to the importance of tachycardia as a sign of unfavorable prognosis in cases which otherwise seem in good condition.

Denzel¹¹ has used **kreosolid**, a magnesium-compound of creosote, in the treatment of tuberculosis, and finds that it is well borne and is not irritating.

E. Lemoine¹² believes that the contraindications for the employment of

¹ Jour. Am. Med. Assoc., July 31, 1897.

² Allg. med. Central-zeitung, No. 75, 1897.

³ Klin. Therap. Woch., No. 6, 1898.

⁴ Wien. med. Woch., Dec. 11, 1897.

⁵ Lancet, Apr. 9, 1898.

¹¹ Pharm. Zeitung, xlii., p. 326.

² Soc. de Biol., Feb. 27, 1898.

⁴ France méd., Nov. 12, 1897.

⁶ Wien. klin. Rundschau, xi., p. 837.

⁸ Münch. med. Woch., Feb. 22, 1898.

¹⁰ Gaz. hebdom. de Méd. et de Chir., Oct. 24, 1897.

¹² Le Nord méd., Sept. 15, 1897.

creosote in phthisis are the existence in early cases of evidences of congestion, disturbance of the digestive organs, hectic fever, and wasting. In these cases it will, he believes, increase the difficulties by overstimulation. Repeated hemoptysis is also a contraindication. C. Lamplough¹ has studied 100 cases of tuberculosis of the lungs which he has treated with beechwood-creosote, using doses as large as 120 minims daily. He concludes that such large doses can be given with benefit. They are best administered in cod-liver oil, and he does not find that gastric disturbance follows such doses, and thinks that this large amount of disinfectant renders tuberculous disease of the bowels less likely. H. Campbell² says that he has obtained useful results in phthisis from the administration of creosote in doses as large as $3\frac{1}{2}$ fluidrams per day, administered in cod-liver oil. The patients, when taking such doses, become so impregnated with creosote that all the secretions and excretions have the odor of the drug. C. W. Graham³ has in one case of tuberculosis increased the dose of creosote up to 680 drops a day, without causing any disturbance. [There does not seem to be any reason for increasing the dosage to this extent, even though the stomach should tolerate it, which would probably rarely be the case. Aside from this, the danger of toxic results must be considered.] T. Zanger⁴ contends that large doses of creosote are not necessary in the treatment of phthisis or diseases of the stomach. In either case he thinks the effect is due chiefly to the action upon the gastrointestinal mucous membrane, and that small doses give much better results. Thomas⁵ has used **enemata of creosote** in 5 cases of tuberculosis of the peritoneum, giving 5 ounces of cod-liver oil containing 8 to 30 minims of creosote and a few drops of laudanum. He has observed the disappearance of both peritoneal and pulmonary symptoms under this treatment. P. Jacob and H. Nordt⁶ have used **creosote carbonate** in 103 cases of tuberculosis of the lungs, beginning with 5 drops three times a day and increasing this dose to 25 drops. They have been much pleased with the action of the drug upon the fever and night-sweats, and especially recommend it because it does not interfere with the digestion of the patient, but rather tends to improve it. While using it the patients much less frequently took cold, and therefore had fewer relapses.

Manders⁷ describes the method of de Backer for the treatment of tuberculosis and cancer. This consists of injection of pure cultures of the **Saccharomyces cerevisiæ**. De Backer found that in healthy animals the yeast-cells underwent multiplication and produced fermentation. Experiments upon guinea-pigs infected with tuberculosis gave encouraging results, and experiments upon human beings caused no harmful results and distinct improvement. The same was true of cases of cancer.

O. Liebreich,⁸ in discussing the aims of modern medical treatment, states that he has investigated the action of **allyl sulphocyanid** in animals infected with tuberculosis, and has found that it distinctly limited the disease; hence, he believes that in phthisis and in other affections we may, by the use of antiseptics, so increase phagocytosis and the action of alexins as to aid the organism in holding microbes in check.

A. Renaut⁹ advises the use of **rectal injections of arsenic** in the treatment of tuberculosis, using 5 c.c. of a solution which contains $\frac{1}{2}$ mg. of arsenious acid, and making 3 injections a day. This is said to be more

¹ Brit. Med. Jour., May 28, 1898.

² Ibid.

³ Med. Week, v., p. 623.

⁷ Brit. Med. Jour., No. 1917, p. 102.

² Sem. méd., xxiii., p. 26.

⁴ Correspondenzbl. f. Schw. Aerzte,

⁶ Charité Annalen, p. 159, 1897.

⁸ Ibid., Oct. 2, 1897.

⁹ Bull. Soc. de Thér., Mar. 9, 1898.

useful than administration by the mouth, since it does not upset digestion; and if it causes rectal irritation, this can be overcome by adding a small portion of laudanum to each dose.

Letulle and Ribard¹ use extreme **cold as a local application** over the epigastrium to overcome the **anorexia** of phthisis. This is applied by using bags containing solid carbonic acid, the temperature of which is about -80°C ., cotton being placed between these and the skin. They contend that this causes increase in nutritive changes and, hence, improvement in appetite.

Gallois and Bonnell² used **hydrogen peroxid** in the treatment of the vomiting of phthisis, putting a soup-spoonful in a liter of wine. They claim improvement of the appetite and decrease of vomiting.

M. Grancher³ insists that upon **successful dieting** depends the successful treatment of tuberculosis. He prefers, as a rule, to treat these patients at their homes, since dietetic rules can usually be more accurately carried out. If the patients are unintelligent or careless they should be treated in institutions.

Huchard⁴ calls attention to Combemale's previous report upon the use of **thallium acetate** in the **night-sweats** of phthisis. He reported that it entirely controlled the sweats in most of the cases without any other unpleasant collateral result than a rapid production of alopecia. Huchard has used the drug in 2 cases, with the result that he controlled the night-sweats, but produced a rapid and extensive alopecia. This latter disadvantage is so great that it must interfere with the use of the drug.

Combemale and Deschemocker⁵ have used with good results doses of 15 to 30 gr. of **sulfonal** in the night-sweats of phthisis. They find that the action persists for several days after its use, and is attended with no unpleasant results in most cases.

A. Salter⁶ found that the **sweat** of tuberculous patients, when injected into guinea-pigs that had been previously infected with tuberculosis, caused a reaction entirely similar to that produced by tuberculin, so that he concludes that the sweats of phthisis are eliminative and should be encouraged. This is not true of phthisis only, as injection of sweat from some cases of pneumonia caused the same symptoms as injections of pneumococci, and the injection of sweat from diphtheria-patients caused tissue-changes similar to those caused by diphtheritic toxin.

E. de Renzi⁷ finds that **thymol** administered in 4-gr. doses is valuable in the treatment of the **fever** of tuberculosis. He begins with three or four such doses daily, and increases until he gives about a dram a day.

C. Horneffer⁸ has used **pyramidon** in 45 cases, chiefly as an antipyretic in phthisis. It is tasteless, and is easily administered in a watery solution. Its effect upon the temperature was satisfactory and there were no ill-effects. It was also useful as an antineuralgic.

L. Guillermin⁹ discusses the treatment of fever in tuberculosis by **phen-acetin**. If the fever reaches 103° or 104°F ., and persists for 12 hours or more, the drug is dangerous. If the fever continues and has many remissions, and reaches a point as high as $101\frac{1}{2}^{\circ}\text{F}$., the drug is useless. It is, however, useful if the fever does not last more than 4 or 5 hours. It decreases the symptoms caused by the fever and favors digestion.

¹ Presse méd.

² Bull. méd., Dec. 8, 1897.

³ Méd. mod., Sept. 11, 1897.

⁴ Med. Week, Sept. 10, 1897.

⁵ Bull. Soc. de Thé., Mar. 9, 1898.

⁶ Bull. de l'Acad. de Méd., May 17, 1898.

⁷ Lancet, June 15, 1898.

⁸ Berlin. klin. Woch., Aug. 30, 1897.

⁹ Thèse de Lyons, 1897.

Hemoptysis.—Huguenin¹ strongly recommends the employment of **ligatures on the extremities** in the treatment of hemoptysis, and states that he has always a supply of thick, elastic rings for this purpose, and when hemoptysis occurs he applies them, and leaves them on for as long as 2 hours, according to the condition produced in the limbs.

C. Y. Bliss² has found the drugs commonly administered in hemoptysis, such as gallic acid and ergot, have little effect or have unpleasant after-effects; but he recommends the use of **turpentine**, and insists upon the value of reducing the amount of fluids taken to half a pint in 24 hours, if possible.

L. W. Flick³ used **nitroglycerin** as a hemostatic in 4 cases of hemoptysis, and had uniformly favorable results.

Tuberculosis of the Larynx.—G. Besold⁴ states that tuberculosis of the larynx, although thought to be nearly incurable, proved in his experience to be very subject to cure in the early stages. These results are not claimed to be due to expertness in treatment, but to his careful and constant examination of the larynx and his more persistent treatment of disease when he does find it. In 346 cases of tuberculosis he found 69 undoubted instances of tuberculous laryngitis, and 41 cases which were strongly suspected of this condition. Of the first series, 32% recovered and 37% improved; and of the 30% that were unimproved, more than half were gravely ill when first seen, and soon died, chiefly from their pulmonary disease. Of the other cases which showed only slightly suspicious signs, more than half were cured. He insists that the larynx should be kept at rest; coughing should be controlled; too much liquid food and too much finely masticated food should be guarded against, as it is likely to enter the larynx and cause irritation; food should not be highly spiced, and if necessary, to prevent irritation, the larynx should be cocainized before eating. Local treatment should be used, if necessary, beginning with powders and solutions, especially menthol-solutions, and if necessary advancing to cauterization or scraping. The author has seen no useful results from the use of tuberculin R.

G. Derscheid⁵ gives records of 270 laryngeal cases treated at **Davos**: 144 were cured, while 12 still under treatment are recovering. Laryngeal tuberculosis of itself is not a contraindication to treatment in high altitudes; indeed, Derscheid believes that sometimes spontaneous cure may occur in laryngeal tuberculosis, as happens in the same disease in the lungs. If the affection of the larynx occurs in feeble or erethic subjects, or is accompanied by advanced pulmonary involvement or other severe general disease, high altitudes are contraindicated.

E. F. Ingals⁶ records a case of laryngeal tuberculosis seemingly cured by the use of **creosote** in doses as large as 2 drams a day.

Lymphatic Tuberculosis.—P. Haan⁷ shows that there are two stages in infection of the glands in tuberculosis. The first is the stage of collection of bacilli from other parts, for the purpose of shutting them off from the remainder of the organisms. The gland-hypertrophy has a protective effect, but it falls a victim to its own physiologic duty and becomes a dangerous element in generalizing the disease. He quotes the statistics of Hijmans to show that early removal of the glands with the destruction of tissue must be looked upon as a dangerous procedure, and that medical procedures should always be first instituted. Of 58 cases in which the glands were excised, 11 acquired phthi-

¹ Correspondenzbl. f. Schw. Aerzte, Feb. 15, 1898.

² Clin. Jour., No. 271, 1898.

³ Phila. Med. Jour., Feb. 12, 1898.

⁴ Münch. med. Woch., June 28, 1898.

⁵ Tuberculose Laryngée et Altitude, 1897.

⁶ Chicago Med. Recorder, Mar., 1898.

⁷ Normandie méd., Feb. 1 and 15, 1898.

sis; the glands were removed by the curet in 33 cases, and 7 of these afterward showed signs of tuberculosis; but of 55 cases which were treated by medical means alone, only 4 became tuberculous.

Tuberculosis of the Skin.—O. Naegeli¹ records a case which was probably originally pelvic tuberculosis, in which scattered nodules appeared in the subcutaneous tissue, but microscopic examination showed that they were tuberculous and had arisen in the deeper layers of the true skin. Bacilli were found in them. The author thinks that this was a case of hematogenous tuberculosis of the skin.

Tuberculosis of the Pericardium.—Simmons² reports a case of tuberculosis of the pericardium in a man of 63, who had cardiac dropsy and died of intercurrent erysipelas. The neighboring pleura was tuberculous and there were some cicatrices in the lungs. One bronchial gland was caseous, and it is probable that this had infected the pericardium. He notes that such cases of almost local pericardial tuberculosis are not rare in the aged.

Peritoneal Tuberculosis.—Boulland³ notes that in the same way that plastic pleurisy sometimes causes a deviation of the sternum to one side, so chronic peritoneal tuberculosis may cause the umbilicus to deviate to one side or the other, sometimes as far as 2 cm.; and this deviation of the umbilicus may be a point of great importance to an operator in determining the location of adhesions in internal strangulation of the intestine, and point out to him the best line of incision.

Uterine Tuberculosis.—P. Audion⁴ records an instance of primary tuberculosis of the uterus and oviducts in a girl of 13, who died of a secondary general acute tuberculosis. The cause of infection seemed to be congestion of the pelvic organs incident upon the establishment of menstruation, with, perhaps, direct infection through the introduction of infected material in the act of onanism.

RHEUMATISM.

Etiology.—[Accumulated experience and experimental investigations warrant the belief that rheumatism is an infectious disease, though there is still considerable doubt regarding the organism or organisms that cause it. Achalme's studies are highly suggestive, but require confirmation.] Achalme⁵ found an organism abundantly present in autopsies upon two fatal cases of rheumatism, and has likewise discovered the same organism in living individuals suffering from rheumatism. This organism is, he believes, directly related to the disease. It is a **bacillus**, somewhat **resembling that of anthrax**, which stains readily by anilin-dyes and by Gram's method. It is anaërobic. Sodium salicylate arrests its development, and when inoculated into guinea-pigs it causes inflammations of serous membranes characteristic of rheumatism. Treboulet and Ceyon⁶ have looked for Achalme's bacillus in several cases of rheumatism, and have found it alone in two severe cases, and in some other cases associated with a diplococcus, which latter was found in all other cases of rheumatism examined. The diplococcus was facultative, anaërobic, and stained by Gram's method. They suggest that Achalme's bacillus is associated with only the severe forms of rheumatism, while their diplococcus may be the cause of the common form of the disease. Thiroloix⁷ has studied

¹ Münch. med. Woch., Apr. 12, 1898.

² Soc. de Biol. de Hambourg, Jan. 14, 1898.

³ Soc. de Méd. et de Pharm. de la Haute-Vienne, Oct. 11, 1897.

⁴ Gaz. hebdom. de Méd. et de Chir., Mar. 6, 1898.

⁵ Ann. de l'Inst. Pasteur, Nov., 1897.

⁶ Bull. de la Soc. méd. des Hôp., Dec. 24, 1897.

⁷ Soc. de Biol., Nov. 6, 1897.

2 cases of acute rheumatism, and states that he has 5 times, since March, 1897, found in the blood of rheumatic cases a bacillus which he believes is pathogenic. Injection caused endocarditis, with fever and dyspnea, and, in some instances, paralysis, resulting in death.

Charrin, in discussion, noted that cardiac affection is the rule in the course of these injections, while arthropathies occur only exceptionally. If this were the real bacillus of rheumatism, one would be inclined to expect the contrary.

A. Riva¹ has employed a culture-medium, consisting chiefly of synovial fluid from the joints of a horse, in the bacteriologic investigation of acute articular rheumatism. Eight cases of acute rheumatism were examined in this way, and cultures were obtained which showed small bodies, to which he has given the name **pseudospores**. These are finally replaced by 2 **bacilli**, which he describes. He believes these microorganisms are the cause of rheumatism.

Singer² has examined 92 cases of acute articular rheumatism by bacteriologic methods, and has discovered **staphylococci** or **streptococci** in the majority of these cases, and postmortem; has in 3 cases been able to discover the same bacteria that he found during life. These were in the peri-articular tissue in one case, and this seems to him to point to the cause of the negative results in the examination of the effusions, since the bacteria in such cases probably have their seat outside the synovial cavity in the periarticular tissues. He believes that the disease is microbic, and therefore that the salicylates are not specific. [This last statement, even though the salicylates are nonspecific, is scarcely warranted in view of what is known regarding malaria.] In a later paper³ he states his belief that the joint-symptoms in rheumatism are due to a toxin carried to them in the blood. He thinks the primary infection is often through the tonsils, and that an endocarditis may be the first lesion, though this is not so common as it seems. The most common organisms found are streptococci and staphylococci. The affection resembles pyemia.

E. Bloch⁴ insists that rheumatism is an infection, but one due to no special microorganism. He states that there is an undoubted relation between rheumatism and sore-throat, but thinks the severity of the one bears no relation to the severity of the other. The most acceptable theory of the relation between the tonsils and rheumatism is that the tonsils act as the seat of growth of the bacteria, and that they subsequently infect the general circulation. Similar results may occur in other organs beside the throat, and after mentioning various such possibilities, Bloch records an instance in which rheumatism repeatedly occurred after vaccination, and also another in which it followed suppurative disease of the ear, and one in which it supervened upon a fistula in ano.

Triboulet,⁵ after an elaborate study of **rheumatism and allied conditions**, reaches the conclusion that there is no proof that spinal changes have any etiologic relation to rheumatism, but both are the results of a general process. He states that some rheumatic conditions are due to cell-destruction and other toxic influences, without direct bacterial influence. Most cases are, however, due to bacteria, but not to any specific bacterium. There is undoubtedly an individual predisposition to the disease, and cold certainly predisposes to it. The most common bacterium found is the staphylococcus, either in cases of ordinary rheumatism or in allied cases. In highly predisposed individuals an acute attack results from infection. In other cases, when the active process of an acute attack has subsided, but when local changes persist, the disease

¹ Centralbl. f. innere Med., Aug. 14, 1897.

² Berlin. klin. Woch., No. 31, 1897.

³ Wien. klin. Rundschau, No. 36, 1897.

⁴ Münch. med. Woch., Apr. 12 and 19, 1898.

⁵ Rev. de Méd., Mar. and Apr., 1898.

becomes chronic; or it may at times be chronic from the beginning when the individuals are fairly resistant to the process, but still show some susceptibility.

F. Barjon¹ does not believe that rheumatism depends upon a primary lesion in the nerve-centers, but that various depressing influences lead to its development. He divides it into **three periods**, in the first of which the manifestations are **articular**; in the second they are **neurotrophic**; and in the third they are due to **spinal** changes. He thinks that the terms true rheumatism and pseudorheumatism will disappear when the causation of rheumatism is more distinctly determined. He has found the X-rays of value in diagnosing chronic rheumatism from other chronic diseases of joints.

Churton² has studied the records of about **600 cases of rheumatism**. He found the previous health was bad in a majority of cases. The chief causes assigned by the patients were wetting and injuries. When there was no cause known to the patient excessive indicanuria was found. Those joints that were chilled or injured were always the first to suffer. [Undoubtedly, though rheumatism is an infectious disease, cold and injuries of the joints are causes of much importance.] There were 150 cases of chorea tabulated, but in most cases it was impossible to state the relation existing between the rheumatism and the chorea. In many cases, however, chorea was immediately induced by shock or by anger.

Complications.—Singer³ gives the records of 7 cases of **erythema multiforme** and of 2 cases of **purpura rheumatica**, all of which occurred during the course of acute rheumatism. Among the various forms that this erythema may take, he mentions erythema gyratum, figuratum, and urticatum, and in severe cases the hemorrhagic and nodose forms. In rare instances the vesicular variety may appear. It most commonly affects the extensor surface of the extremities, and it may be either idiopathic or symptomatic. Of the latter, the most common forms are those which occur with pyemia; the next most common are those seen with rheumatism. The idiopathic form is most common in the spring and fall, and is accompanied by fever, pains in the joints, tonsillitis, and sometimes endocarditis. It also runs a somewhat relapsing course, and therefore shows great similarity to acute articular rheumatism. The eruption is sometimes due to localization in the skin of micro-organisms which are in the circulation, and usually staphylococci and streptococci are found. The only forms not septic are those which are purely nervous. From the great resemblance to rheumatism, he feels justified in believing that the latter is a septic disease.

G. Singer⁴ reports a case which exhibited an interesting relation between **osteomyelitis** and acute articular rheumatism. There was an attack of osteomyelitis in the seventh year of the patient's life, and this became chronic. During its course there was one attack of swelling of the knee, and, later, an attack of general rheumatism, which subsequently recurred and was accompanied by heart-disease. During this attack the bone-trouble ceased and the wound closed. After the rheumatism was recovered from the bone-trouble broke out again, and another sequestrum was removed. This case, together with his experience of having seen tonsillitis precede many cases of rheumatism, convinces Singer that the latter is a clinically peculiar form of pyemia. [Many analogous observations have been recorded, and others might be cited from experiences of clinicians. We recall, for example, a case of rheumatism of typical character which was brought to the hospital, and in which a wound of the hand, in bad condition and containing pus enclosed

¹ Gaz. des Hôp., Aug. 28, 1897.

² Wien. klin. Woch., No. 38, 1897.

³ Brit. Med. Jour., Oct. 30, 1897.

⁴ Wien. med. Woch., Sept. 25, 1897.

by a thick scab, was discovered. After attention had been given to the wound the rheumatism was easily controlled.]

J. Lindsay¹ records a case of rheumatic **hyperpyrexia** in which, just before death, the axillary temperature was 110.7° F.

S. G. Sloman² reports a similar case in which the temperature reached 110.5° F. just before death. J. S. Withers and O. Withers³ describe a case in which the temperature rose rapidly after the pains had subsided, and reached 110° F., while the patient became comatose. The use of a cold bath reduced the temperature, and recovery ultimately occurred.

Diagnosis.—P. Marie⁴ describes a **new symptom-complex** which is apt to be mistaken for chronic rheumatism of the ordinary type, and to which he gives the name of **rhizomelic spondylosis**, because the chief symptoms are ankylosis of the vertebral joints and of the large joints connecting the limbs with the trunk. This affection has occurred in his experience exclusively in males. He reports 3 personal cases and 4 which he has found in the literature. It begins in early adult life with pain in the knee, and later in the articulation between the coccyx and sacrum, the latter being violently severe. It is followed by ankylosis of the vertebrae, beginning below and slowly progressing upward. Ankylosis of the hip generally comes on at the same time. The restriction of movement in these joints finally becomes absolute. The patient ultimately assumes a position somewhat like the letter "Z," since he becomes inclined in the cervicodorsal region and at the hips, and to preserve his equilibrium keeps his knees somewhat bent. The gait, Marie says, reminds one of a toy-manikin. The other large joints may show moderate limitation of motion. The ribs finally become motionless and the breathing is entirely abdominal. The patients cannot lie in the dorsal position, owing to the ankylosis. The progress of the disease is slow, and there is never any appearance of acute inflammation. It is distinguished from acute rheumatism by the entire absence of involvement of the small joints, and from kyphosis by the fact that in this condition the deformity of the spine is somewhat curvilinear, while in the affection now described by Marie there is a sudden single bend forward in the upper dorsal region. There is no history of infection preceding this disease.

Treatment.—P. Collangettis⁵ has studied the **indications** for the administration of the **salicylates** when **albuminuria** is present with rheumatism. He has found that albuminuria is a very frequent condition in rheumatism, and is present in greater or less degree in 40% of cases, but in most it is but slight. In such cases there is no contraindication to the use of the salicylates, but these help to cause the disappearance of the albumin. When there is evidence of actual nephritis, with a good deal of albumin and but a small quantity of urine, the salicylates are often extremely dangerous.

G. Lassere⁶ has used **methyl salicylate** for rheumatism, administering it internally in a mixture of equal parts of sweet punch and water, to 200 parts of which he adds 1 part of the methyl salicylate, and orders 6 oz. of the mixture to be taken during the 24 hours. In 40 cases of rheumatism this has been effective in relieving the pain.

G. Linossier and M. Lannois⁷ again recommend the use of **methyl salicylate** by **local application**. They quote the reports of a number of authors to prove that the effects are good. In acute articular rheumatism the

¹ Brit. Med. Jour., Mar. 5, 1898.

² Ibid., Apr. 9, 1898.

³ Thèse de Paris, 1897.

⁴ Ibid., Mar. 26, 1898.

⁵ Rev. de Méd., Apr. 10, 1898.

⁶ Nouveaux Remèdes, No. 22, 1897.

⁷ Boll. de l'Acad. de Méd., Mar. 22, 1898.

influence of methyl salicylate is the same as that of sodium salicylate, since the former becomes the latter as soon as it enters the circulation; but the methyl salt has the advantage that it does not irritate the stomach. In subacute and chronic cases they state that the methyl salicylate has marked superiority to the sodium salt, since it has both a general and a local action. It has some valuable effects in gouty cases as well, and even upon infectious rheumatic joint-inflammations. After experimenting upon certain individuals whose absorption was, as far as possible, identical, they came to the conclusion that absorption is far better and more rapid in case the drug is applied in ointment and then well covered with a bandage, than when the bandage is left off, so that they feel obliged to recommend the constant use of a dressing over the ointment. Siredey¹ states that methyl salicylate is distinctly different from the essence of wintergreen, and the latter should not be used in its stead. He applies the methyl salicylate to the skin over the affected joints after the latter have been washed. It is put on drop by drop, and the joint then enveloped in gutta-percha tissue and a flannel bandage applied to it. This may be renewed twice in 24 hours, if the pains are very troublesome. The quantity used may be as large as 120 drops. This is a difficult and almost impossible treatment in acute rheumatism, and the drug is then best administered internally; but in subacute or chronic cases it is a valuable treatment. Heart-complications do not contraindicate it. Linossier and Lannois² have found that much less salicylic acid is found in the urine when methyl salicylate is applied in vaselin- or lanolin-ointment than when it is directly applied to a part and subsequently bandaged, so that in its local use they recommend that it be covered, as nearly as possible, hermetically.

S. Sterling³ particularly recommends the **external use of salicylic acid** in those patients with acute rheumatism whose stomachs will not allow of the internal administration of the drug. He says, however, that he has seen severe gastric irritation from even this method of administration, as the salicylic acid is excreted by the stomach. The administration is effected by rubbing an ointment into the skin.

Harlet⁴ has been able to treat acute articular affections by the **rectal administration** of sodium salicylate, and by means of this and local applications of the drugs he claims that the pain is usually relieved within three days.

G. Singer⁵ discusses the treatment of articular rheumatism by **intravenous injections of corrosive sublimate**. The solution employed is mercuric bichlorid, 1 or 2 parts; sodium chlorid, 1 or 2 parts; water, 10 parts. The dose of sublimate is from $\frac{1}{8}$ to $\frac{1}{3}$ gr. Six to 10 injections in the course of the treatment suffice. He treated 11 cases, the results being lessening of the pain, diminution of the swelling, and decrease of the fever. The occurrence of secondary joint-affections was not prevented. The treatment is specially indicated when the rheumatic trouble has a pyogenic character, when the salicylates are inapplicable, or when the trouble is localized to one joint. It is contraindicated in weak persons or when severe renal degeneration exists, or symptoms of poisoning develop. [This method of treatment does not seem free from danger, and is not likely to be generally popular.]

Klimenko⁶ has found **salophen**, in daily doses of from 45 to 90 gr., useful in acute or chronic rheumatism when sodium salicylate has been useless.

Gaudin⁷ has used **malakin** in rheumatism with advantage, no bad results

¹ Jour. de Méd., Aug. 25, 1897.

² Münch. med. Woch., Mar. 8, 1898.

³ Centraltbl. f. d. gesammte Therap., Heft 1, S. 1, 1898.

⁴ Vratsh, p. 1083, 1897.

⁵ Bull. de l'Acad. de Méd., Mar. 22, 1898.

⁶ La Nord Méd., May 15, 1898.

⁷ Jour. de méd. de Paris.

following even daily doses of 10 gm. Children are said to take the remedy well. S. J. Korotkoff and P. S. Usoff¹ have had marked success with malakin, and state that it does not cause ringing in the ears, deafness, perspiration, or disturbance of the digestive organs. H. Schulz² states that the **indications** for the use of **colchicum** in gouty rheumatism are great tenderness of the affected region, profuse sweating, marked thirst, concentration of the urine with increased respiration, and overaction of the heart.

F. W. Todd³ states that he was, in his early practice, in the habit of **bleeding** cases of acute articular rheumatism almost to syncope. The results were very satisfactory, and heart-complications were, at the most, rare.

Bier⁴ has used **artificial hyperemia** in treating various conditions, and found it of use in gonorrheal rheumatism and of considerable value in chronic rheumatism and arthritis deformans. It was of uncertain value in acute rheumatism, and made syphilitic foci and sarcomata worse.

G. M. Blech⁵ has treated 6 patients with chronic rheumatism by the **hot-air-bath** method. In all these individuals there seemed to be absolute cure. [Our experience is by no means so satisfactory. In some cases there was temporary relief; often there was none at all, and never "absolute cure."]

Sibley⁶ used **hot-air baths** in the case of a girl who had ankylosis of the right knee and both elbow-joints from rheumatism. She was obliged to use crutches, and had been almost helpless for 2 years. After 54 treatments her condition was almost normal.

Sokoloff⁷ has used the **Röntgen-rays** in the treatment of rheumatism in 4 children, and has had very pleasing results. The patients were placed about 2 feet from the tube, and the action of the rays was allowed to go on for from 10 to 20 minutes.

Myositis.—H. Strauss⁸ divides **rheumatic indurations of muscles** into those caused by matting together of neighboring muscles and surrounding tissues by the inflammatory process, those affecting individual muscles throughout the body, and those in which there are well-circumscribed nodules in portions of the muscles. He presents the records of several cases of the latter variety, in which pain had been so prominent and severe a symptom as to prevent the patients from working. In one case in which the nodule was removed all the symptoms subsided. Microscopic examination of this nodule showed that it was composed of scar-tissue with a few degenerated muscle-cells. The other cases improved greatly or were completely cured by the use of massage and hot baths. In the diagnosis of this condition he states that the discovery of a small hard tumor is sufficient if local muscular contractions are guarded against by using only gentle manipulations in the examination. Indurations from trauma are excluded by the history; syphilitic indurations are more common in the arms, while the rheumatic form is common in the shoulder- and calf-muscles. Varices may sometimes cause error, but these are excluded by finding others in other portions of the body. The treatment should consist of massage and baths, and, if necessary, excision.

INTOXICATIONS RESEMBLING INFECTIONS.

Weber⁹ divides **autointoxications** into those arising in various disorders of the gastrointestinal tract; a group which results from the overproduction of

¹ Therap. Woch.

³ Jour. Am. Med. Assoc., Sept. 18, 1897.

⁵ Jour. Am. Med. Assoc., Oct. 9, 1897.

⁷ Vrach, No. 46, 1897.

² Wien. med. Presse, Nos. 31-33, 1897.

⁴ Münch. med. Woch., No. 32, 1897.

⁶ Med. Times and Hosp. Gaz., No. 1003.

⁸ Berlin. klin. Woch., Jan. 31, Feb. 7, 1898.

⁹ Post-Graduate, July, 1897.

metabolic products or from pathologic metabolic products, examples of which are uremia and diabetic coma, the cause in this group being unknown, but the diseases with which they occur being well recognized; a third form, in which there are anomalies of metabolism without any definite local disease, examples being the uric-acid diathesis and gout; and a fourth variety, which includes those autointoxications due to extreme diminution or entire cessation of function of certain glands, in some cases associated with anatomic changes, in other instances without such, though there is commonly atrophy of the gland. The chief result of the absence of the glandular functions seems to be the loss of some neutralizing principle which destroys poisons and metabolic products. Myxedema and Addison's disease are common examples of this form.

William Armstrong¹ reviews some of the work upon **gastrointestinal autointoxication**, which he says may be either slight and transient or severe and lasting. He divides the poisons developed in the body into ptomaines and leucomaines; the products of digestion, such as peptones; and organic acids, ammonia and its compounds, and various other similar substances arising from faulty metabolism, which are capable of setting up a train of morbid symptoms without any organic disease being present. Autointoxication is not constantly present, because the liver usually destroys the poisons, and because many of the poisons are antagonistic to each other. Among the causes of the formations of these poisons, he makes defective action of the nervous system important, while gastric dilatation, overeating, and atony of the bowels are other serious factors. He considers that acute rheumatism, the uric-acid diathesis, and the nervous irritability frequently attending dyspepsia are due to autointoxication. In the treatment, beside local treatment of the stomach and bowels, he believes that the nervous system should be especially attended to, using change of air, baths, massage, and exercise. F. Müller,² after a general description of **intestinal autointoxication**, discusses rapid cases which resemble acute poisoning, and the more protracted cases which often resemble typhoid fever, and calls attention to the fact that different individuals differ greatly in their susceptibility to these poisons. Functional disorders of the digestive organs especially favor such intoxications. At present we know little of the subject, however, and theorization is futile. Medication should consist chiefly of purgatives and lavage.

Éwald, in discussion, mentioned 2 of his own cases of intestinal autointoxication. In one of these there was an attack of coma with imperceptible pulse and profound collapse, which was due to prolonged constipation. The other occurred in a woman of 53. She had vertigo, vomiting, and various grave nervous symptoms, which were attributed to cerebral syphilis, but she was cured after overcoming persistent constipation. Albu also cited a case of gastric dilatation in which coma habitually appeared whenever fermentation became excessive or when vomiting ceased; this was commonly about every 5 weeks, and the attacks finally led to death from cardiac weakness. Huchard³ delivered a clinical lecture upon toxic conditions arising from the alimentary tract, particularly dyspnea of this origin. This symptom is usually associated, as in the case which he reports, with a certain degree of arrhythmia, and sometimes with a slight apical murmur. It is important to distinguish these conditions from uremia, as they are often to be seen in cases of early Bright's disease. There is then no marked change in the kidneys, but the toxins from the alimentary tract are excreted with difficulty in the early stages of renal sclerosis. Chronic cases of intoxication from the alimentary tract are likely

¹ Brit. Med. Jour., July 31, 1897.

² Congress of Internal Medicine, Berlin, 1897.

³ Jour. de Méd. et de Chir. prat., July 10, 1897.

to be mistaken for heart-cases, as they are apt to have a weak systole, some arrhythmia, and a slight murmur, and sometimes temporary pulmonary congestions. Digitalis does harm in these cases, and the best treatment is to stop the use of meat and give a milk-diet instead. Tedeschi¹ notes the histories of 7 individuals who had attacks of severe pain over the heart, with dyspnea and a sense of impending death. In none was there any disease of the heart or lungs. The attacks commonly came on directly after going to sleep. They were usually accompanied by dilatation of the heart, and were followed by polyuria, and the author believes they were due to autointoxication from the gastrointestinal tract, as all the patients had digestive disturbances.

W. H. Thomson² reports a number of cases of **persistent tachycardia**, with digestive and nervous disorders. The cases resembled exophthalmic goiter, excepting that none of them had either enlargement of the thyroid or exophthalmos. All had marked digestive disturbance preceding the occurrence of other symptoms, and all improved markedly upon careful restriction of the diet and the use of intestinal antiseptics. One case had attacks of blindness, which Thomson considers analogous to migraine. Another case had attacks of diplopia, aphasia, violent vertigo, and of severe pains in various parts of the body and limbs, together with a pulse-rate of 160. All cases were subject to violent pains of a neuralgic character, and in 2 cases these pains had a peculiar tendency to localize themselves, especially in the arms. Thomson considers that these were cases of gastrointestinal intoxication.

A. K. Bond³ records a case of **mania** which occurred, in a man of 25, during convalescence from measles. He had violent delirium, with delusions of persecution, and sedative drugs had no effect upon the condition. He improved only after free bowel-movements were obtained. The author thinks that the condition was due to **intestinal autointoxication**. W. Stekel⁴ suggests that the occurrence in **migraine** of almost constant vomiting, frequent attacks of diarrhea, and polyuria or increase in other secretions, is proof that many cases of this affection depend upon intoxication. The occurrence of these attacks at the menstrual period, and the discovery of acids and of toxins, and of an excessive amount of metabolic products in some of these cases, are advanced as further support for his view. It also seems probable to him that many of the attacks are due to the uric-acid diathesis. The best proof of all that intoxication is the basis of this affection is, in his belief, the result of treatment, which in his hands is chiefly vapor-baths or prolonged hot packs with subsequent cold douches, and, with these, proper diet. He has found that the results following such treatment are usually satisfactory if one has been careful to exclude previously the possible presence of errors in refraction, or of adenoids and other similar abnormalities, which at times give rise to the trouble.

S. Arloing⁵ has in further experiments confirmed his previous statement that the **sweat** of human subjects is toxic. This toxicity increases after severe muscular exercise, being most marked in sweating after prolonged fasting. The toxic substance acts upon the circulatory organs and the respiratory and vomiting-centers, and also causes anemia. He has found such toxic property in the sweat of normal animals. He therefore believes that sweating is valuable in overcoming intoxication.

¹ Riforma Med., 1897.

² Med. Rec., Aug. 14, 1897.

³ Maryland Med. Jour., Jan. 29, 1898.

⁴ Wien. med. Wochn., Nov. 13, 1897.

⁵ Bull. de l'Acad. de Méd., Aug. 3, 1897.

DIATHETIC DISEASES.

GLYCOSURIA.

[A number of interesting investigations regarding alimentary glycosuria have been published, but the pathogenesis is still obscure in some particulars. The *role* of the liver in particular merits more extended study, and the relations of general metabolism to this form of glycosuria have not been cleared up.] F. Voit,¹ after injecting subcutaneously various kinds of sugar and determining whether they were excreted in the urine, and, if so, in what form and amount, has come to the conclusion that dextrin and starch are saccharified within the body as well as by the blood-serum after its removal from the body, though it is not known whether this action is due to the blood or to the cells in general. Intermediary products are formed, as shown by the fact that a part of the erythro-dextrin and amylo-dextrin disappeared, though a smaller part was excreted as achroo-dextrin. The part which vanished undoubtedly became grape-sugar, and was burnt up as such. He also concludes that Fischer's statement that alcoholic fermentation of the polysaccharids, when due to yeast, is always preceded by their being broken up into the simple sugars, is likewise true when the organs of a living man cause the fermentation, and the polysaccharids cannot be directly oxidized. When a form of sugar cannot be broken up by the human organism this form cannot be oxidized, as was shown in Voit's experiments with milk-sugar. The change of achroo-dextrin into maltose and dextrose is difficult for the human organism, since after injections of amylo-dextrin and erythro-dextrin neither these nor dextrose appeared in the urine, but only achroo-dextrin.

W. Rosenstein,² in investigating the **effect of nourishment** on the excretion of sugar in carbonic-acid poisoning, finds that the sugar only disappears from the urine of dogs poisoned with carbon dioxide when there has been a great loss of albumin from the body, such as after a 3-days period of starvation. It was always present, however, when the animals had been fed for weeks upon fat and carbohydrates, without any proteids. It was found that peptones and leucin produced by pancreatic digestion did not cause glycosuria, but that digestion-products which were soluble in alcohol did, even when the animal had been starved for several days previously.

J. C. J. Bierens de Haan,³ in experimenting upon the production of alimentary glycosuria in patients suffering from **liver-affections**, has found that he produced this condition with 150 gm. of grape-sugar in 18 of 29 cases. In cases of other affections, with the exception of 2 of chronic nephritis, his results were negative. The urine should be examined in portions passed at various times during the day, since sugar will be sometimes found present and at other times not. The chief interest in his results is that, contrary to the previous results of French authors, he found alimentary glycosuria in 7 out of 10 cases of Hanot's cirrhosis. The condition was most frequently present in those cases that showed severe constitutional depression, and is certainly frequent in cirrhosis of the liver.

C. Achard and J. Castaigne,⁴ in considering the errors in the demonstration of an alimentary glycosuria, insist upon the importance of testing the **gastro-intestinal power of absorption** and the **renal permeability**, both of

¹ Deutsch. Arch. f. klin. Med., Sept., 1897.

² Arch. f. exper. Path. u. Pharmacol., Band xI., S. 363.

³ Archiv f. Verdauungskrankh., Band iv., Heft 1.

⁴ Gaz. hebdom. de Méd. et de Chir., Nov. 25, 1897.

which can be done by giving methylene-blue. In testing the renal permeability, the drug should be given by the hypodermic method; in testing the gastrointestinal absorption, it is given by the stomach; in each case noticing the rapidity of its appearance in the urine. After determining that the normal amount of sugar that should be taken without causing a glycosuria was about 150 gm., they found that with unimpaired absorption and elimination, but with diseases of purely hepatic origin, the amount possible to take was distinctly decreased. When, however, either absorption or elimination was difficult the amount could be increased, even with liver-troubles, to as much as 400 gm., and with difficulty in both absorption and elimination it was possible still further to increase the amount without causing alimentary glycosuria.

Krehl¹ has made some interesting observations upon alimentary glycosuria **after beer-drinking**. The subjects of his investigations were students. Sugar appeared in the urine frequently after various kinds of beer, but more frequently after morning-drinking. Five out of 14 cases showed glycosuria after morning-beer. After the evening-beer there was but 1 case of glycosuria out of 19 examined. The individual disposition to glycosuria varied greatly, and did not depend solely upon the amount of beer the students drank at the time or habitually. The difference seen between the morning- and the evening-drinking was probably due to differences in absorption. Krehl does not believe that the cause was alcohol alone.

R. de Campagnolle² has investigated the occurrence of alimentary glycosuria in 10 **febrile cases**, and has found that in all these individuals doses of 150 gm. of glucose, or even much less, caused glycosuria. The percentage of sugar eliminated in fever is extremely large as compared with physiologic glycosuria. The elimination in these febrile cases varied considerably with the individual.

Van Oordt³ has investigated the occurrence of alimentary glycosuria in many instances of **nervous diseases**. In 75 cases of organic diseases of the brain and cord he had 12 positive results; while in 103 cases of functional disease of the nervous system there were 13 positive results, of which 4 were major hysteria. In 5 cases of tumor of the brain there were positive results; in 1 of these the tumor was in the cerebellum, in 2 in the cerebrum, and in 2 in the pons. The only organic diseases of the spinal cord in which sugar appeared in the urine were progressive muscular atrophy and syringomyelia.

S. Mawin⁴ records the results of his experiments in the production of alimentary glycosuria after the administration of **thyroid extract**. Only 2 of 25 cases showed glycosuria after taking this substance, so that these results are in accord with those of Strauss and Goldschmidt in showing that thyroid extract does not usually favor the occurrence of alimentary glycosuria.

DIABETES.

Etiology and Pathology.—Bard and Pic⁵ discuss the question of the occurrence of diabetes in primary cancer of the pancreas. They have some doubt of its occurring as frequently as is believed by some others, since glycosuria may be either simple or associated with actual diabetes. They insist upon the importance of the presence of sclerosis of the pancreas. In 2 cases of simple glycosuria, the autopsies upon which they report, they attribute the glycosuria to the sclerosis of the pancreas and not to the cancer, and believe

¹ Centralbl. f. klin. Med., No. 40, 1897.

² Deutsch. Arch. f. klin. Med., Apr., 1898.

³ Münch. med. Woch., Jan. 4, 1898.

⁴ Berlin. klin. Woch., Dec. 27, 1897.

⁵ Rev. de Méd., Dec. 10, 1897.

that such is the case in many instances reported as glycosuria in cancer of the pancreas. When there is true diabetes in pancreatic cancer they believe that the diabetes has often antedated the cancer. In all, they found 150 cases of primary cancer of the pancreas on record, and in only 17 was there any record of glycosuria, and probably in many of these cases the diabetes occurred before the cancer. The fact that the glycosuria is apt to disappear in the later stages of the disease they would explain by their belief that the cancer-cells take up the physiologic function of the pancreatic cells and produce a glycolytic ferment, which has in the earlier stages been absent, or present in small amount, only because of the sclerosis of the glandular tissue. [There is little proof that the cells of carcinomata elsewhere take up normal functions, except in a very imperfect way, and it is doubtful if such occurs in the case of cancer of the pancreas.]

T. B. Fletcher¹ has analyzed the 69 cases of **diabetes mellitus** which have been recorded in the Johns Hopkins Hospital. They comprise but 0.15% of all medical cases; 70 % of them occurred in people between 30 and 60 years of age. Five were negroes, of whom 4 were females. In the 7 fatal cases the condition of the pancreas was not noted in 1, while in 1 other it was normal. In the other 5 it was abnormal: in 1 case atrophied, in 3 excessively firm, and in the other small, soft, and opaque-looking.

R. Lépine² records an interesting case of a woman, 64 years old, who was admitted to the hospital with a slight hemiplegia. She had at this time absolutely no sugar in her urine. The hemiplegia disappeared almost entirely; but she was admitted again 4 years later, showing the signs of diabetes and having a large quantity of sugar in her urine. She died, and the whole of the brain was found normal externally, excepting atheroma of the arteries at the base; while in the left hemisphere there was found an old yellow softening in the internal capsule and corpus striatum. Lépine thinks that there is no doubt that this **cerebral lesion** set up the diabetes. [It may be questioned if records of cases like the above and the inferences ad much in the knowledge of obscure diseases like diabetes. There is much speculation and little evidence of value in many of the publications.]

H. Stern³ insists that in his opinion the affection commonly called diabetes is **not a disease per se**, but is only one stadium of a general diabetic deterioration, which consists of a preglycosuric stage; a second period with glycosuria, and which is recognized as diabetes mellitus to-day; and, third, a postglycosuric stage, or that of autointoxication. His own clinical observations and investigations of the urine seemed to show that the glycosuria is not directly dependent upon the alimentation; that carbohydrates do not influence its excretion to the extent that is commonly believed; and that azoturia is always present during the glycosuric stage. The azoturia is not a direct result of increased ingestion of proteids, but usually exceeds the amount equivalent to the proteid ingestion. He advances the theory that there is a plasmolytic, dextrose-generic process which causes the disease. [It is well known that the ingestion of carbohydrates is not necessary to continued excretion of glucose in some cases; and it is also well known that acid-intoxication occurs in the terminal stages of diabetes.]

F. Hirschfeld⁴ states that he does not believe that there is any relation between **obesity and diabetes**. He thinks the cause of their frequent association is the habit obese patients commonly have of taking excessive amounts of food and an insufficient amount of exercise. He supports his view

¹ N. Y. Med. Jour., Dec. 4, 1897.

² Rev. de Méd., Oct. 10, 1897.

³ Med. Rec., Dec. 18, 1897.

⁴ Berlin. klin. Woch., Mar. 7, 1898.

by drawing attention to the fact that the idle and well-fed classes of society are more subject to the disease. [It is probably true that the mere fact of obesity does not explain the occurrence of diabetes; but it is probable that underlying causes that lead to obesity also occasion diabetes. Sometimes the affected person eats less than the healthy, though this is certainly not the rule. The author is an extremist in denying any relationship between the two conditions.]

Kolisch and Stejskal,¹ after investigation of the amount of sugar in normal and diabetic blood, state that **jecorin** is present in the blood of diabetics in considerable quantity, while the preformed sugar is much less than has been usually accepted, so that glycosuria is not the result of a hyperglycemia. In normal blood they also obtained small values for sugar, but relatively high ones for jecorin, though the amount of the latter was less than in diabetic blood. In alimentary glycosuria the blood contained some jecorin.

Ludwig,² in a fatal case of diabetes, found areas in the upper part of the mucous membrane of the ileum which were readily detached, and some losses of substance which had a hemorrhagic and necrotic base. These were due to necrosis of the epithelium of the tubular glands. He believes the cause was a **toxemia** occurring as a result of the disease.

Symptomatology.—H. Stern³ has studied 32 cases of what he considers diabetes mellitus in its **prodromic stage**; 14 of these have since become cases of glycosuria. The chief evidences of the prodromic stage of the disease are, in his belief, gastrointestinal disturbance with intolerance of carbohydrates, sometimes also of hydrocarbons, often associated with hyperchlorhydria. Sickening pain in the epigastrium, which is increased after eating, and a dull pain in the right hypochondrium, are frequent, as in polysarcia. Excessive hunger and thirst are absent at this stage. Sexual inclination is diminished, and there are nervous irritability and occasionally hypochondriasis. Emaciation does not occur in this stage unless there is a complication. There are frequent disorders of the skin. Perspiration is often diminished or suppressed, or there may be transpiration. In treatment he advises change of climate, air-baths, flannel underclothing, exercise, and dietetic measures similar to those used in actual diabetes. The bromid of gold and sodium has seemed to him a useful drug.

Boisumeau⁴ relates 6 cases of his own of **conjugal diabetes**, and reviews other cases reported. It usually appears quite early in married life. He relates several cases in which it attacked either husband or wife, subsequently affecting the other, and, after the death of one of the married pair and the remarriage of the other, the second spouse acquired the disease. Usually the husband was attacked first. The length of time between the appearance of the disease in the one and the affection of the other was from 3 months to 16 years. The course of the disease does not differ from that of the usual hereditary form, and husband and wife commonly present no parallelism of the course of the disease. The similarity in mode of life, diet, etc., cannot explain all cases, since in many instances the husband was away from home a great part of the time. There are some instances which strongly suggest contagion, such as 2 of Funoro's cases; but if the affection is contagious we know absolutely nothing of the contagium and the manner of its conveyance, and further proof is necessary to establish its contagiousness. [This subject has been referred to in previous numbers of the YEAR-BOOK. The means of the communication of the disease is entirely obscure.]

¹ Wien. klin. Woch., No. 50, 1897.

² Centralbl. f. innere Med., p. 1105, 1897.

³ N. Y. Med. Jour., July 10, 1897.

⁴ Thèse de Paris, No. 428, 1897.

Lenné¹ contends that the division of cases of diabetes into **benign and unfavorable**, according as sugar can be made to disappear from the urine or not, is improper, as he has seen the so-called benign cases develop into severe and fatal cases. As to the contagiousness of diabetes, he considers this question unsettled. He has seen 3 instances of marital diabetes, but considers them coincidences. He also finds that so-called cases of diabetes descipiens, or those without increase of excretion of urine, are common, reaching nearly 25% of all cases. That the amount of urine is not increased in these cases is due to the fact that thirst is not excessive; when excessive thirst appears these cases assume the ordinary form of diabetes. [The fact that mild diabetes may become severe and uncontrollable does not deprive the separate classification of such varieties of its clinical value.]

H. S. Stark,² in discussing diabetes, states that he has had under observation for 5 years a woman, 45 years of age, who showed marked emaciation, severe nervous and mental depression, polyphagia, polyuria, and a violent pruritus vulvæ, while her urine was always of high color and specific gravity, but never at any time showed a trace of glucose.

R. H. Fitz,³ in considering **pancreatic diabetes**, says that it is difficult to make such a diagnosis, since this form of disease presents no distinct symptoms. In 29 cases from the records of the Massachusetts General Hospital, in which there were changes in the pancreas, glycosuria had been noted but twice; and of 166 cases treated in the same hospital, fatty stools were not recorded in any instance. In considering treatment, Fitz mentions 1 case in which remarkable improvement followed the exhibition of raw calf-pancreas.

Lépine⁴ states that in diabetes mellitus due to **nervous lesions** the glycosuria is often very moderate in degree and may vanish, leaving a simple polyuria. The form which occurs with gout is apt to be of considerable severity, though it is of benign nature. Certain cases are due to an increased metabolism of nitrogenous food, since many diabetics excrete considerable quantities of sugar when on purely albuminous food. This fact is a support for the theory that sugar may be formed in the body directly from albumins. The cases associated with pancreatic disease are rapid in their course.

Hirschfeld⁵ has studied the **excretion of acetone** in diabetics who were not comatose. In the milder forms of the disease there was scarcely any difference from normal conditions, and complicating diseases have practically no influence upon its excretion, even in diabetes. In severe forms more is excreted, and with grave forms of the disease there is a large amount. The quantity decreases in the latter two forms of the disease when carbohydrates are added to the nourishment. Only in these cases is there a real pathologic acetonuria, and, as such, it is a disturbance of metabolism characteristic of diabetes. Combined with glycosuria and diminished absorption of food it forms a characteristic picture of the disease.

Moraczewski⁶ has investigated the excretion of **calcium chlorid** in the urine of diabetics. He finds that of all the chlorids ingested 37% was lost; while of the calcium phosphates there was double the amount excreted that was taken in the nourishment. On the other hand, there was a considerable portion of the chlorids and nitrogen retained in the organism. The other elements of the urine seemed normal. Especially when antidiabetic diet was given was the excretion of all the elements of the urine, excepting calcium, normal, so that this loss of calcium salts seems to be a specific symptom. The

¹ Deutsch. med. Woch., No. 32, 1898.

³ Yale Med. Journ., Mar., 1898.

⁵ Zeit. f. klin. Med., Band xxxiii., Hefte 3 and 4.

² Med. Rec., Sept. 11, 1897.

⁴ Sem. méd., Aug. 27, 1897.

⁶ Centralbl. f. innere Med., No. 36, 1897.

author questions whether animal diet may not cause diabetic coma in consequence of its poverty of calcium. The addition of calcium to the diet causes a decrease in the glycosuria, and seems to have a favorable effect.

Troisier¹ has made methylene-blue injections in a diabetic to test the **permeability of the kidneys**. In spite of the fact that the patient was excreting in 24 hours 20 liters of urine containing 1 kilogram of sugar, the permeability of the kidneys was within the normal limits, so that their function seemed to be entirely normal.

J. M. Macphail² records a case having the symptoms of diabetes, with sugar in the urine and the formation of cataracts, in which the **specific gravity of the urine** was said to be but 1010 at one examination and 1000 at the next.

R. Lépine³ records the observation of a marked **hyperglycemia** in diabetes. The amount of sugar in the blood reached at one time 10.6 gm. per thousand. This was, he believes, explained at autopsy by the discovery of severe nephritis, which had caused the sugar to accumulate in the blood.

W. Ebstein⁴ has determined the amount of **CO₂ eliminated by the lungs** in a patient with diabetes, and found it considerably diminished below that of normal individuals. R. T. Williamson,⁵ in a study of the **knee-jerks** in diabetes mellitus, states that in his previous report he noted that he had found the knee-jerks absent in 25 of 50 cases recorded. He has studied the small peripheral nerves in 3 cases, and found them normal in all. In 2 cases there were slight changes in the posterior columns of the spinal cord; in 1 case neither the cord nor the nerves showed any pathologic changes. Most of the cases whose knee-jerks were gone were below 50 years of age, and were usually in an advanced stage of the disease. Loss of knee-jerks seems less frequent in private practice than in hospital-cases, and they are frequently lost or diminished late in the disease when present earlier. In 18 of 21 cases of diabetic coma the knee-jerks were gone. They were more frequently absent in patients under 30 years than in those who were older. Since, however, this symptom may depend upon so many different causes, no definite prognostic value can be attached to it. Schupfer⁶ found that the patellar reflex was absent in 57% of the cases of diabetes that he examined. He attributes its absence to toxic effects, and believes that it is only occasionally an evidence of disease of the nerves or the spinal cord. De Renzi⁷ found the patellar reflex absent in 50 cases of diabetes, in 10 others it was weak, and in only 2 was it normal, but its intensity was of absolutely no value in indicating the severity or the duration of the disease.

Complications.—F. Cornaille⁸ discusses the occurrence of **aphasia** in diabetes. This has not been a widely recognized complication, but it may occur with either the recognized form of the disease or when it is latent, and is sometimes the first symptom that leads to an examination of the urine. It may occur together with other nervous symptoms, such as paralyses, or alone. It is, at times, simply a muscular disability from paralysis of the lips or tongue, but at other times is a true aphasia, and may have the characters of the various forms of this affection. Its occurrence has no special relation to the quantity of sugar or the severity of the disease; but it is, perhaps, more frequent in pancreatic diabetes, and uncommon in the diabetes of childhood and the arthritic form. The prognosis is not grave and the affection is usually

¹ Presse méd., No. 12, 1898.

² Rev. de Méd., Oct., 1897.

³ Lancet, July 17, 1897.

⁴ Rivista clin. e terapeut., No. 3, 1897.

⁵ Indian Med. Gaz., Jan., 1898.

⁶ Deutsch. med. Woch., Feb. 17, 1898.

⁷ Soc. Lancisiana Roma, Jan. 24, 1898.

⁸ Thèse de Paris, 1898.

transitory, having much the same character as the other forms of diabetic paralyses. It is probably due to the infection which occurs in the disease.

Drouineau¹ has studied diabetic **hemiplegia**, which is not so uncommon a condition as is usually supposed. It is more common in those diabetics who are alcoholics or have a nervous tendency. The hemiplegia of itself has no special character and does not occur with any particular form of diabetes, and it may be transitory or permanent. It is caused by softening or hemorrhage in the brain. The permanent forms may come on slowly or suddenly and last a variable time. The transitory form may persist for only a few hours when the paralytic symptoms vanish; but they are apt to reappear. In the diagnosis the uncommon occurrence of unconsciousness, the atypical paralytic symptoms, and the tendency to a spontaneous cure, are important. The prognosis is not absolutely bad, but depends upon the individual case.

W. Ebstein² discusses the relation between **epilepsy** and glycosuria, or diabetes mellitus. He refers to several cases in his experience, and says that the relation may be one of pure association, the epilepsy may be due to diabetes, or the diabetes may be the result of the epilepsy. A fourth possibility, however, must be considered—namely, that both conditions result from a single lesion of the brain or nervous system.

Marie and Robinson³ report 2 cases in which, after money-losses, the patients exhibited **melancholia** with suicidal tendency, and associated with impotence and insomnia. There was in the urine a substance that reduced Fehling's solution, but was left-rotatory, and was associated with neither polyuria, polyphagia, nor polydipsia. The symptoms improved under a diet suitable for diabetes.

S. C. de Veny⁴ discusses the occurrence of **mental symptoms** in diabetes, and records a case in a man of 65 years, who, before he saw him, was said to have had repeated attacks of mental disturbance, which became better when the urine contained large amounts of sugar and grew worse when sugar was present in smaller amounts. When seen the man had marked insomnia, and after diminution in the amount of sugar became agitated and had delusions of financial misfortune and erotic hallucinations. His mental trouble seemed to be of a confusional type, since he could be recalled to entire sanity by questions in relation to business. The sugar-reaction diminished or increased in intensity in inverse ratio to the mental disturbance. He subsequently had loss of power in the left arm and both legs, with some atrophy and ataxic gait. Both knee-jerks were absent, while ankle-clonus was present on both sides. There were defect of speech and syllable-stammering. Treatment was difficult, as improvement in the glycosuria was attended by increase in the mental symptoms. He died after about five years' treatment.

T. L. Chadbourne⁵ records a case that had at 36 years of age the symptoms of diabetes, and had since his twenty-fifth year also shown thickening of his hands, feet, and face. Chadbourne believes that it was a case of **acromegaly** with diabetes.

Bettmann⁶ reports the uncommon combination of **Graves's disease** and diabetes mellitus. The urine contained moderate amounts of sugar and gave a marked reaction with ferric chlorid; but the sugar vanished under proper diet and the use of opium. An interesting symptom was the decrease in the number of leukocytes when an increase of carbohydrates caused increase in the glycosuria. The author believes that the diabetes was caused by the poison

¹ *Gaz. des Hôp.*, Nos. 41-45, 1897.

² *Med. Week*, p. 308, 1897.

³ *N. Y. Med. Jour.*, Apr. 2, 1898.

⁴ *Deutsch. med. Woch.*, Jan. 6, 1898.

⁵ *Medicine*, Oct., 1897.

⁶ *Münch. med. Woch.*, No. 48, 1897.

of the Graves's disease. [The occurrence of glycosuria in Graves's disease is not a very rare complication.]

A. Robin¹ insists that **albuminuria** is a serious and not uncommon complication of diabetes. It may be caused by phosphaturia; by deficiency of salines in the blood, leading to diffusion of albumin through the glomeruli; to disturbances of digestion; or to the excessive strain thrown upon the kidneys by the polyuria itself. His method of treatment is to give antipyrin until the sugar is considerably decreased, afterward placing the patient upon milk-diet until the albumin decreases. The sugar will meanwhile have increased again, so that he once more gives antipyrin. He claims valuable results from this alternating treatment of the albuminuria and glycosuria. Goudart² discusses diabetic albuminuria, and uses, in slight cases, proper diet and antipyrin for a few days. If the sugar decreases he then devotes his attention to the albuminuria; if it does not, he uses sodium arsenate with codein and lithia, when the glycosuria usually diminishes. He then treats the albuminuria. If albumin is present in large quantities, he uses milk-diet and strontium lactate.

Diagnosis.—Schupper³ has found that the amount of sugar in the urine of diabetic patients varies at different times during the day, and is always greatest between 8 and 10 in the morning; while it is at its lowest point in the early evening. This would indicate that patients can take farinaceous substance better in the afternoon and evening than in the morning, and that examination for sugar should be undertaken in the morning.

Achard and Weil⁴ have made **subcutaneous injections of glucose** in diabetics, and have found that there is a temporary increase in the excretion of sugar, and in cases which had been almost or entirely latent the diabetes became manifest through these injections. They are, therefore, of diagnostic value in cases without glycosuria. In 5 arthritic subjects without glycosuria the injection of $2\frac{1}{2}$ to 10 gm. of glucose caused sugar to appear in the urine.

Loewy⁵ has **modified Bremer's test** of the blood of diabetics by staining 2 minutes in a 2% methylene-blue solution, and then 10 seconds in a 25% eosin solution. He found that in all cases of diabetes whose urine contained more than 2% of sugar this reaction was obtained in the blood. He has not obtained it in any cases of severe anemia, though he has had no opportunity to try it in leukemia. The presence of the blood-plasma is not necessary for the reaction, since he found that after centrifugating blood from a diabetic patient, and washing the corpuscles until there was no trace of sugar, the reaction was obtained from the corpuscles.

Eichner and Föchel⁶ have been able to get positive reactions to **Bremer's test** with the blood of other diseases than diabetes, and they find, with Lépine and Lyonier, that this test depends chiefly upon a diminished alkalinity of the blood.

Jaroussoff⁷ records 2 cases of diabetes, in one of which the disease seems to have been due to a tubercle in the floor of the **fourth ventricle**, and in the other case all of the organs were normal excepting the **pancreas**, which showed fatty degeneration and sclerosis. The digestion of albumin was very imperfect in this patient. In both cases fats were fairly well digested; but in the case with disease of the pancreas the inorganic substances were passed in large amounts in the stool. This seems to him a point of diagnostic value.

Treatment.—Beylot⁸ has found that alimentary glycosuria in dogs can

¹ Bull. gén. de Thérap., Aug. 15, 1897.

² Soc. Lancisiana Roma, xxvii., 2.

³ Fortschr. der Med., Mar., 1898.

⁴ Méd. mod., p. 15, 1898.

⁵ Jour. de Méd., Aug. 25, 1897.

⁶ Soc. méd. des Hôp., Feb. 18, 1898.

⁷ Wien. klin. Woch., No. 46, 1897.

⁸ Rev. des Sci. méd., July 15, 1897.

be much reduced in amount by administration of **yeast**. This causes fermentation of the sugar, and acts for several days after its ingestion. He finds that in diabetes it causes increase in the weight and strength and diminution in the sugar, but it acts only upon the sugar derived from the food.

J. W. Daniels¹ reports his results from the treatment of 6 cases of diabetes mellitus by **uranium nitrate**. In 1 case only was there any intolerance of the drug. One case showed no improvement, but all the others improved very considerably, both by decrease of the glycosuria and gain in strength.

E. Duncan² reports 5 cases of diabetes treated by **uranium nitrate** in doses of from 5 to 20 gr. *t. i. d.* Improvement of the general health and strength, together with diminution of the urine and of the amount of sugar in the urine, was the result, he believes, of the use of this drug. Tyson and Saundby said, in discussing the paper, that they were convinced that uranium nitrate had no specific effect in diabetes.

Estay³ treated 2 cases of diabetes with **methylene-blue**, with successful results. In the first case the sugar diminished from about 60 gm. per liter to 20 gm. per liter after the administration of 7½ gr. of methylene-blue daily for 8 days. The urine was also less in amount and thirst diminished. In the second case the urine decreased within a month from 30 gm. per liter to 5 gm. per liter. The doses in this case had been 1½ gr. 4 times a day. Marie⁴ administered methylene-blue to a case of diabetes in which 37 gm. of sugar were passed daily. After the institution of this treatment the sugar disappeared, but this may have been largely due to the special diet which he was taking.

Jaccoud⁵ recommends, above all other drugs, the use of **arsenious acid** in diabetes, in doses as large as ⅛ gr. in the day. If this is badly borne he uses the extract of thebaica, giving 6 or 7 gr. daily, and with this he administers oxygen. In cases of progressive emaciation he finds a mixture of 100 gm. of glycerin and 2 gm. of tartaric acid with some rum, added to a liter of water, is very useful. [We have found that arsenic in large doses tends to cause diarrhea, which in diabetes is a troublesome and at times a dangerous symptom.]

A. Massy⁶ records 2 cases of diabetes which he treated with **static electricity**. They had been resistant to other treatment, but after the use of electricity the amount of sugar, which had been enormous in one case, decreased very greatly. The polyuria was lessened and the general condition became greatly improved, and remained so.

Gilbert and Carnot⁷ have found that **extract of liver**, when administered to diabetes by rectal injections, caused a marked decrease in the excretion of sugar.

A. Telnichin⁸ describes his personal experience with the use of **spermin**. He presented signs of severe diabetes 3 weeks after injury in a railroad accident, and as there was no response to treatment by numerous drugs, he and his attendant, Litkin, prepared an extract from the testicles of bulls and dogs. So long as he takes this he is comfortable and entirely free from any symptoms, and this has been the case for several years past. He takes it for 2 months, using daily injections; then omits it for about the same time, when the symptoms always recur, and he then recommences the treatment.

Diet.—V. Noorden,⁹ in dieting diabetic patients, first determines their tolerance for carbohydrates. He gives them 100 gm. of bread, and if no sugar

¹ Northwestern Lancet, Mar., 1898.

² Méd. mod., Jan. 27, 1898.

³ Méd. mod., No. 14, 1898.

⁴ Med. Week, p. 301, 1897.

⁵ Brit. Med. Jour., Oct. 16, 1897.

⁶ Med. Week, p. 227, 1897.

⁷ Jour. de Méd. de Bordeaux, Mar. 27, 1898.

⁸ Vrach, vol. 19, No. 11.

⁹ Die Heilk., Band 1, Hefte 1 and 2.

appears with this amount the quantity is increased as far as possible. The necessary increase in food to replace the carbohydrates must usually be in proteids, since fats are not so well borne, though the latter are theoretically better. The indications for an absolute diet and the circumstances under which it is not dangerous when carefully used are recent occurrence of the disease, persistent excretion of sugar, severe weakness, emaciation, and complications like gangrene and disturbances of vision. The cases in which it is contraindicated are those of advanced age, those having a tendency to diarrhea and complications, and those with a severe grade of nephritis or gout. Robert Saundby,¹ in opening the discussion on the dietetic treatment of diabetes at the Montreal meeting of the British Medical Association, insisted that we must recognize that diabetes mellitus is but a name given to a clinical group characterized by the presence of persistent glycosuria. We must, therefore, vary our dietetics according to the individual case, watching at the same time the effect upon nutrition and weight, as well as the effect upon the sugar in the urine. It is well to begin by strict limitation of the diet, omitting all sugars and starches, subsequently adding as much carbohydrate as the patient may be able to ingest while retaining the best condition of health possible with the disease. Most of the foods put upon the market for diabetics contain a large proportion of carbohydrate, and should be investigated before being used. He first places his patients upon a diet composed of eggs, bacon, green vegetables, and tea or coffee, with some sugar-free alcohol diluted with water, if the patient wishes the alcohol, giving him at the same time gluten-biscuits free from starch. After the sugar has nearly or quite disappeared he adds potatoes and milk, gradually increasing if the increase produce no ill-results; finally giving as free a diet as is compatible with a good condition of the patient.

In discussion, Shingleton Smith said he believed that there is greater danger in too much latitude in diet than in too rigid restriction, and he believed in absolute restriction of carbohydrates until sugar disappears or a complication necessitates a change, subsequently adding as great a variety of food as may be possible. E. Duncan believed that the body-weight and muscular strength are more important matters to consider than the amount of sugar in the urine, but that, particularly in young persons affected with disease, there is often inability to utilize sugar, and in such cases absolute restriction of the diet, with complete rest, is necessary, and is ultimately followed by improvement or recovery. James Tyson divided the cases into the mild and the severe, the first being characterized by the possibility of complete removal of sugar from the urine by dietetic treatment alone. It is important so to restrict these cases in their diet that they do not pass into the severe forms, putting them, at intervals at any rate, upon a sufficiently rigid diet to remove all sugar from the urine. The severe cases are to be restricted to a minimum of carbohydrates. Permanent disuse of this class of foods cannot be attempted without upsetting the patient. Jacobi thought the younger the patient the more absolutely should carbohydrates be restricted, older patients bearing them fairly well.

G. W. Murdock,² acting upon Bouchardat's statement that sugar disappeared from the urine of diabetics when subjected to the **semistarvation** of the siege of Paris, treated one of his cases, a young man who had diabetes, by cutting down his food 33% at one stroke. Immediate improvement resulted; and when subsequently his food was so much reduced as to make him very hungry, steady and persistent improvement ensued and has continued, sugar having reappeared but once or twice, and then in small quantities. The general health was good under this treatment.

¹ Brit. Med. Jour., Oct. 16, 1897.

² Med. Rec., Oct. 9, 1897.

RHEUMATOID ARTHRITIS.

J. Stewart¹ discusses the **relation between rheumatoid arthritis and rheumatism, tuberculosis, and nervous diseases.** He concludes that rheumatoid arthritis has been proved to occur in people of rheumatic tendency, and that the presence of an infectious disease of any kind tends to increase this disposition, as do all causes of depression of resisting power, such as worry, exposure, or traumatism. There is no special line to be drawn between certain cases of chronic rheumatism and the early stages of rheumatoid arthritis, and no sufficient evidence of a nervous origin of the latter or of a direct relationship between this disease and tuberculosis; but the polyarticular form, the clinical features of an infectious disease, and the results of recent investigations point strongly to an infectious cause. It was notable that in 30% of the cases which Stewart observed there was a history of gonorrhea, and in 50% a history of some previous infectious disease.

W. P. May² has examined some **bones 5500 years old**, which were found in a tomb in a cemetery of the fifth dynasty at Deshashch, and discovered undoubted signs of rheumatoid arthritis in the inferior maxilla, the odontoid process of the axis, and all the other vertebræ, as well as in the shoulder-joints, the knee-joints, the ankles, and nearly all of the small joints. Microscopic examination showed the appearance characteristic of rheumatoid arthritis.

G. A. Bannatyne³ records two instances of the occurrence of **pericarditis** in rheumatoid arthritis. In both cases the signs of pericarditis arose after the rheumatoid arthritis had shown well-marked progress. In one the pericarditis was followed by pneumonia, diarrhea, and a skin-eruption; in the other, herpes preceded the appearance of pericarditis and pleurisy. He thinks these facts point strongly to a blood-infection. In both cases the joint-symptoms cleared up rapidly and the patients recovered almost entire health. He suggests the possibility that the organism which is believed to have caused the pericarditis might have elaborated a substance curative of the rheumatoid arthritis.

D. Riesman⁴ reports 2 cases of rheumatoid arthritis, accompanying the report with skiagraphs. The first case was interesting in that there was no pain in the articulations most extensively diseased, and there was involvement of the **laryngeal cartilages.** The joints bore great resemblance to spinal arthropathies. In the second case the disease came on after sea-bathing and progressed rapidly, destroying the cartilages of joints and causing atrophy of the muscles and marked contractures. There was exaggeration of knee-jerks and of ankle-clonus. After 17 months of confinement to bed there was gradual, but practically entire, recovery.

Treatment.—A. Ott⁵ thinks that the good effect of treatment of rheumatoid arthritis by **hot-air baths** is due chiefly to the degree of heat of the baths. The heat stimulates the skin and unloads the deeper vessels. Treatment should never be begun with very hot baths, owing to their general effects. [The experiments of Frazier showed that the general effects of local hot-air baths are very trifling.]

Zolotorin⁶ administered **lactic acid** in doses as large as 40 drops a day to a patient who had been confined to bed for a year, owing to arthritis deformans, and had been a sufferer from the disease for 10 years. He states that within 3

¹ Montreal Med. Jour., Dec. 1897; Brit. Med. Jour., Oct. 30, 1897.

² Brit. Med. Jour., Dec. 4, 1897.

⁴ Jour. Am. Med. Assoc., Aug. 7, 1897.

⁵ Verhandl. des XV. Congress f. innere Med., 1897.

³ Ibid., Jan. 15, 1898.

⁶ Méd. mod., vol. ix.

weeks the woman was able to get out of bed and walk about, and that she subsequently became almost entirely well.

PULMONARY OSTEOARTHROPATHY.

E. M. Hasbrouck¹ records a case of pulmonary osteoarthropathy, which he says is the sixth American case on record. It occurred in a negro of 55. There was, first, a tumor of the lower jaw, which afterward involved nearby glands. Eight months after this the hands and feet became enlarged, and this enlargement increased until it was very marked. Slight temporary improvement seemed to follow an injection of mixed erysipelas- and prodigiosus-serum, but death resulted finally from weakness and dyspnea. After death there was found alveolar **sarcoma** of the jaw, with extensive **metastasis** to the **right lung**. The author illustrates this case with numerous valuable radiographs.

J. L. Steven² records a case which he believes is of the same nature as hypertrophic pulmonary osteoarthropathy. It occurred without any associated **pulmonary disease**. The fingers, hands, wrists, and forearms were so enlarged that the change in their size was at once noticeable. The fingers were clubbed and the nails greatly incurved, the whole finger being thickened, especially at the joints. The hand could not be entirely closed. Radiographs showed subperiosteal formation of new bone in the metacarpals and phalanges. There was a similar change in the lower extremities, but no change in the face or tongue. A considerable degree of pain and stiffness was noticed in the joints, particularly in the knee-joints, which were enlarged, and creaked on movement. There was also dimness of vision, with a woolly appearance of the right optic disc. Steven suggests that in the absence of pulmonary disease the affection may have been rheumatic in its nature. There were none of the classical deformities of chronic rheumatoid arthritis. The use of saline baths with massage and the internal administration of alkalies caused a considerable degree of improvement.

GOUT.

Etiology and Pathology.—C. Mordhorst³ deals with the pathogenesis of gout, stating that in any alkaline fluid the basic substances combine with uric acid, if this substance be added, to form a urate. If the liquid become saturated with this urate, the latter is thrown down in the form of spherules, which are at first very small, but grow by accretion to a considerable size. They may subsequently be converted into biurates. Their deposition is caused by addition of more uric acid, by evaporation of water from the solution, by cooling the solution, or by reducing its alkalinity. These deposits are met in nonvascular tissues only, the alkalinity of which is less than that of the blood; hence, if a transudate which is almost saturated with urates enter such tissues, deposition of the urates occurs; and this precipitation in the spaces of the interstitial tissue and in the lymph-channels is, in Mordhorst's view, the essential cause of the symptoms of gout. If these depositions subsequently disappear by solution, the acute symptoms disappear. If under very unfavorable conditions the tissue-fluids are neutral, or even acid, these deposits may be decomposed, and free uric acid and crystals fill up the larger lymphatic vessels, thus leading to sudden blocking of these vessels and an attack of inflammatory gout. When alkalinity is restored the uric acid is reconverted into the granular urates, which are gradually further converted into sodium biurate, and a crys-

¹ N. Y. Med. Jour., May 14, 1898.

² Glasgow Med. Jour., Oct., 1897.

³ Zeit. f. klin. Med., vol. xxxii., p. 65, 1897; Lancet, July 17, 1897.

talline gouty deposit is formed. Therefore the inflammatory process is really curative, causing an increased supply of alkaline blood in the affected part, and, by raising the temperature, favoring more rapid osmotic interchange between the blood and the seat of the gouty affection.

W. Armstrong¹ considers **autointoxication** from the **gastrointestinal tract** to be the cause of gout, and in order to limit this he put a number of cases of gout upon large amounts of water. He limited their food at first to scraped beefsteak, thus, he believes, limiting fermentation in the gastrointestinal tract. He describes some rather remarkable results in the improvement of patients. He would limit the use of this treatment to those cases that have failed to improve upon other treatment, and would exclude any individuals who have albuminuria or organic heart-disease. [This plan of treatment is not new, nor is it as satisfactory as the author of the paper seems to believe.]

C. G. Stockton² expresses his conviction that gout is a definite disease and differs from lithemia. The former is due to causes largely unknown, while the latter is, he believes, a gastrointestinal autointoxication. The diet he recommends in the former is one containing but little nitrogen, while in the latter a nitrogenous diet is often beneficial; but the diet should be determined in each case according to the special indications. [The term lithemia must be defined more satisfactorily before it will be possible to determine its relationship to gout or other disorders. Undoubtedly some of the cases known as lithemia are forms of gout.] Luff³ also records his estimations of the alkalinity of the blood in a patient with subacute gout. Compared with that of normal individuals, this patient's alkalinity was equal to about the average, and the alkalinity of the blood and the acidity of the urine during an attack of gout showed no constant relationship.

A. P. Luff⁴ believes that the **excess of uric acid** in gout is due to insufficient secretion, as the existence of such insufficiency has been proved, and there is no proof of any overproduction. He thinks that uric acid is produced in the kidneys from a combination of urea and glycozin, and the harmful effect of certain foods and drinks is believed to be due to their increasing the amount of glycozin formed in the liver. Diminished alkalinity of the blood certainly has little effect upon the production of uric-acid depositions, since the alkalinity is certainly little, if at all, diminished in gout, and its diminution does not decrease the deposition of sodium biurate.

B. H. Rachford⁵ contends that arteriosclerosis and rheumatic gout are oftentimes due solely to lithemia. He has found **paraxanthin** common in lithemic cases who have migrainous attacks; but while he found the xanthin-bodies increased in gout and arteriosclerosis, paraxanthin was not. He therefore believes that this body is not responsible, but some other, closely related to it, is.

Treatment.—Walter⁶ recommends the use of **saligenin** and **aminoform** in the treatment of gouty conditions, the former seeming most useful in acute attacks, and causing rapid improvement; while the latter is best used in those who are of gouty diathesis, but do not have severe attacks.

Jollenaere⁷ recommends **lycetol** as a solvent for uric acid. He claims that it is active as such, and is also a diuretic, besides relieving pain in both chronic gout and rheumatism.

¹ Lancet, July 3, 1897.

² Brit. Med. Jour., Apr. 23, 1898.

³ Phila. Med. Jour., Apr. 16, 1898.

⁴ Jour. Am. Med. Assoc., July 31, 1897.

⁵ Lancet, June 15, 1898.

⁶ Münch. med. Woch., Mar. 8, 1898.

⁷ Lancet, vol. ii., p. 39, 1897.

R. Newman¹ recommends the use of **static electricity** in gout and the uric-acid diathesis, having found in his own case, and in patients whom he has treated in this manner, that it wards off acute attacks and acts as a general tonic, relieving the headaches and confusion of ideas, stimulating secretion, and resulting in the absorption of inflammatory products.

W. K. Sibley² records several cases, among which there were instances of both acute and chronic forms of gout, which were benefited by local **hot-air baths**.

H. C. Wood,³ in discussing the treatment of gout, says that there is no diet which is suited to all cases, and that individual cases must receive an individual diet. The most important point in the treatment of the disease is well-chosen persistent exercise. Of medicinal methods of treatment, he considers the salicylates undoubtedly the best. The salts which should be used are those of ammonium and strontium. In his use of hot baths he has seen no good results in rheumatoid arthritis, or in chronic inflammations of the joints, even of a typical gouty character. When the deposits are outside of the joints and in the tendons the results seemed marvellous, and the same was true of acute strains and inflammations of tendons. It is of value in subacute rheumatism because of the sweating it produces.

H. Leber⁴ has investigated the **influence of alcohol** upon the excretion of uric acid, and finds that in 3 cases there was practically no influence at all. In a case of gout there was a notably small excretion of both uric acid and total nitrogen. There was no relation to be seen between acute exacerbations of the gout and the daily excretion of uric acid. The phosphates were somewhat increased during the alcohol-period. In none of the cases was there any influence upon the acidity of the urine, except in the gouty individual, whose urinary acidity increased by 18%. The influence of salt solution upon the excretion of uric acid was also investigated, and it was found that there was a slight increase of uric acid, while the urinary acidity and the phosphates remained practically unchanged. Further investigations were instituted to determine the effect of the "lemon-cure" upon the elements of the urine, and it was found that it had no distinct influence. D. T. Savill⁵ brings forward his personal experience and his observation of numerous cases to prove that those alcoholic beverages which contain a considerable percentage of sugar are the only ones distinctly harmful in gout. Some cases are actually benefited by alcoholic stimulation, providing the beverages are not sugary. Beer is the worst form of beverage.

OBESITY.

A. Robin⁶ states that obesity should generally be treated as hereditary, and as due to imperfect oxidation and want of proper assimilation. Some cases are, however, the result of excessive assimilation, and dry diet can do good only in this form of cases. Robin insists that meats should be eaten cold, since when taken cold they cause much less increase in weight than when eaten hot. He gives 5 meals a day, of which 2 are composed of a moderate quantity of nitrogenous substances and green vegetables, with very little bread, though some gluten-bread may be allowed. The other 3 meals consist chiefly of weak tea without sweetening, and at one meal eggs and a little bread. With this there must be plenty of exercise, accompanied by hydrotherapy, and the amount of sleep must be restricted to 7 hours in adults. Drugs are not usually needed and may be

¹ Med. Rec., p. 848, 1897.

² Jour. Am. Med. Assoc., July 31, 1897.

³ Lancet, Aug. 14, 1897.

⁴ Lancet, July 10, 1897.

⁵ Berlin. klin. Woch., Nov. 1 and 8, 1897.

⁶ Bull. gén. de Thérap., Oct., 1897.

dangerous, and emaciation should not be desired. There is usually a natural tendency to corpulency, and one should attempt to produce only a moderate decrease in weight.

Kisch¹ recommends in the treatment of obesity limitation of food, this being brought down to the smallest number of calories compatible with the retention of the metabolic equilibrium of the patient. There should be an adequate amount of proteids, a moderate amount of carbohydrates, and but a minute amount of fat allowed, and highly spiced foods should be avoided, as they tend to increase the appetite. If the heart is weak, fluids should be strictly limited. Anemic people should drink less than the plethoric. There should be regular exercise instituted, of a character dependent upon the condition of the heart. The hours of sleep should be limited, and sleeping during the day should be forbidden. Baths, especially carbon-dioxid baths, are valuable, and the individual should, if possible, live in a pure air rich in ozone, which stimulates activity of the lungs and of the general system.

W. Zinn² records some experiments in metabolism during the treatment of obesity by **thyroid extract**. The nitrogen-balance remained positive, but the body-weight decreased about 4 pounds in 5 days. The absorption of the proteids was excellent, and the fat was well absorbed, so that the loss in weight seemed to be due to the loss in water and the oxidation of fat. Lépine³ considers the loss in weight after the use of thyroid extract due to diminution in water, fats, and proteid material. If large enough doses are given they may cause glycosuria, and in those cases of exophthalmic goiter that tend to have glycosuria the exhibition of the thyroid will increase this tendency. One case of diabetes was much improved by the use of thyroid extract.

W. Winternitz⁴ strongly recommends the use of **hydrotherapy** in obesity. The cold water increases the loss of heat, and thus causes combustion of the fats.

OSTEOMALACIA.

Bernstein⁵ describes a patient who presented characteristic signs of osteomalacia, and to whom he administered oophorin in large doses for 6 weeks. There was absolutely no improvement, but upon the administration of phosphorus decided improvement occurred.

Débove⁶ describes a progressive **osteoporosis** resembling osteomalacia, but without softening of the bones. It usually appears in adult men, and causes deformities of the skeleton. It is painful and progressive, with exacerbations: the subjects usually die from pulmonary complications.

DISEASES OF THE BLOOD.

CONDITIONS AFFECTING THE CONSTITUTION OF THE BLOOD.

A. Loewy, J. Loewy, and L. Zuntz⁷ describe the results of their observations upon the physiologic influence of **rarefied air** and the climate of **high altitudes**. The breathing-capacity was found to be much greater at high altitudes than under influence of simple rarefied air alone. In the pneumatic cabinet there was an increase of between 1.42% and 8.8% with a pressure of

¹ Wien. med. Presse, Mar. 13, 1898.

² Sem. méd., Dec. 22, 1897.

³ Münch. med. Woch., Apr. 5, 1898.

⁴ Berlin. klin. Woch., July 5, 1897.

⁵ Blätter f. klin. Hydrother., Dec., 1897.

⁶ Bull. de l'Acad. de Méd., July 20, 1897.

⁷ Fortschr. d. Med., July 15, 1897.

460 mm. At a high altitude, with a pressure of 485 mm., there was an increase of between 46.8% and 50.1%. Zuntz found that on the summit of Mount Rosa-Gipfel, after several hours' rest, there was an increase of 114% when the pressure was 424 mm. The pulse and respiration are increased in rate and the consumption of oxygen is increased. They found the specific gravity of the blood and the number of red corpuscles decreased, contrary to the observations of other authors, and attribute these changes in the blood, not to an actual change in its composition, but to variation in its distribution. Stengel,¹ in a discussion on the blood in cardiovascular disorders, expresses the same view—viz., that the changes in the number of blood-corpuscles at high altitudes are probably due to alterations in the distribution of the blood. A. Gottstein,² as a result of his studies, concludes that the increase in the number of red corpuscles at high altitudes is due to two factors, one being the actual influence upon the blood and hemoglobin, and the other the effect of air-pressure upon the counting-apparatus. He shows that an alteration of 0.01 mm. in the cell-chamber used in counting the blood causes an error of 500,000 in the count. Reduction in temperature also causes very marked changes, even up to 12% ; but since these changes found experimentally are not so great as those which occur in high altitudes, and since the changes found at high altitudes last for some time after returning to the original elevation, the change is certainly not due entirely to variations in the instrument used.

E. Meissen and Schröder³ find that **variations in atmospheric pressure** cause a considerable variation in the result of the blood-count with the Thoma-Zeiss apparatus. They have, therefore, modified the cell by having a narrow groove, $\frac{1}{2}$ mm. in depth, ground in the slide in a radial direction from the edge of the cell, running out far enough to go beyond the cover-glass when this is applied. This allows of an equalization of pressure and prevents variations in the depth of the space between the counting-surface and the cover-glass. They find that estimations of blood made at high altitudes with this cell and the old cell show differences as great as 500,000 corpuscles to the c.mm.

G. Carrière⁴ contributes the results of his observations on the **effects of cold** upon the blood. The red corpuscles become greatly diminished and their functional activity decreased, much of the hemoglobin becomes dissolved in the serum, and the serum is much more toxic than normal. Intestinal antiseptics did not influence the destruction of corpuscles. The author attributes the conditions he finds to the probable retention of toxic products which should be eliminated by the skin. R. Friedländer,⁵ in investigating the effect of changes in temperature upon the blood, finds that persistent cold causes decrease in the red cells, lowering of the specific gravity of the blood, and increase of the leukocytes, without any changes in the serum. In the reactionary stage, after the effect of a brief period of cold was passing off, there was increase of the red and white cells, while the specific gravity increased. Heat causes the red and white cells to increase, the latter more than the former; the specific gravity becomes higher and the serum more concentrated. The changes in the red cells are, he believes, due to change in the distribution of the plasma and cells throughout the system. The author sees some therapeutic worth in using warm baths to increase the number of leukocytes.

Popelsky⁶ has investigated the **influence of the liver** upon the constitution of the blood, by establishing a fistula between the portal vein and the vena cava, and so excluding the liver-circulation. The number of young

¹ Proc. Path. Soc. of Phila., Mar. 15, 1898.

² Münch. med. Woch., Jan. 25, 1898.

³ Congress for Intern. Medicine, Berlin, 1897.

⁴ Berlin. klin. Woch., May 23, 1898.

⁵ Bull. de l'Acad. de Méd., Feb. 15, 1898.

⁶ Vrach, No. 47, 1897.

leukocytes in the blood decreased at once. In from 3 to 18 days after the operation there was a leukocytosis, but the older forms of leukocytes were present in greater number than the young forms. None of the usual elements of the blood were absent, even after a considerable time, so that the liver cannot be of much importance as a hematopoietic organ, but it seems to be of importance in maintaining the proportion of the elements of the blood. [The objections upon technical grounds to the author's experiments rob his deductions of all value. The operation itself is a serious one; and, besides, the portal vein does not alone supply the liver with blood.]

Askanazy¹ has estimated the **amount of water** in the blood and blood-serum in numerous conditions, and finds that the blood of men contains 78.087%, and that of women 79.47%, of water; while the amount in the serum of men is 90.44%, and in that of women 89.99%. The specific gravity of the blood in the two sexes was 1060.1 and 1056.4 respectively; of the serum, 1029.7 and 1030.2. Compensated disease of the heart caused the serum to be somewhat more dilute, but did not change the condition of the blood in general. In nephritis, if dropsy were not present, the blood was nearly normal; but in dropsy both the blood and serum showed excess of water. In anemia there was also increase of water in both the blood and the serum, and the same was true of febrile conditions.

Gilbert and Garnier² state that after the removal of a large collection of fluid, particularly of large collections in the abdominal cavity, the blood becomes thickened from transudation of serum into the cavity just emptied, so that the number of red cells may be increased, even one to two millions in a c.mm. This **serous anemia** is, they state, the cause of death in many cases, which rapidly grow worse after repeated tapping.

A. Loewy and P. F. Richter³ have made further studies of the **effect of leukocytosis** upon other changes in the blood, and especially have they studied the question of the amount of destruction of leukocytes when variations in their number exist. After injections of nuclein and spermin they found albumoses in the blood during the existence of both hyperleukocytosis and hypoleukocytosis; and also, in the latter stage, after pilocarpin-injections. This did not occur when these substances were added directly to the blood; and the presence of albumoses was, therefore, not due to any immediate effect that the substances themselves may have had upon the blood. These albumoses were also not produced by the manipulations necessary in the demonstration of their presence, since they were found after the albumins had been entirely removed. The fact that albumoses were not found in all cases may be due either to the fact that the amount of destruction of leukocytes differs, or that the albumoses were present but a short time, and might have been overlooked. These results seem, therefore, to point to the fact that there is destruction of leukocytes in both hypoleukocytosis and hyperleukocytosis. The authors also investigated the effect of destruction of the leukocytes upon the amount of sugar in the blood, and the amount of fermentation of sugar owing to the action of the leukocytes. They found that in both hyperleukocytosis and hypoleukocytosis the glycolytic action was distinctly less, and they think this is of importance in explaining the occurrence of alimentary glycosuria in certain conditions associated with fever and leukocytosis, since under such circumstances the blood will become hyperglycemic, because the liver is constantly adding more sugar to the blood, and the blood has lost its power to reduce the sugar.

¹ Deutsch. Arch. f. klin. Med., Dec. 9, 1897.

² Gaz. hebdom. de Méd. et de Chir., Feb. 3, 1898.

³ Berlin. klin. Woch., Nov. 22, 1897.

B. Peltyn¹ has investigated the **proteolytic action** of the **halogen salts**, and finds that sodium chlorid in solutions of various strength has a distinct proteolytic action upon fibrin and other genuine albumins, and lesser or no action upon coagulated albumin, casein, and vegetable albumins. The proteolysis was less marked than that resulting from the action of pepsin. Of other salts, potassium chlorid, ammonium chlorid, and some of the fluorids had a distinct proteolytic action. The action of bacteria was excluded by finding that cultures from the solutions were sterile. He suggests that fibrinolysis in the blood may be due to the salts in the blood-serum.

Stengel² discusses in a general way the nature and varieties of anemia. He points out that the tendency in recent years has been to exaggerate the importance of morphologic changes. Corpuscular changes have been placed at too high a value in significance, and the alterations of the fluid element of the blood have been too often disregarded, except by physiologists. He believes that the more important changes are those that occur in the serum, and that the corpuscular changes are often secondary to these. In speaking of the classification of anemia he uses the terms *primary* and *secondary* in the sense that the former are varieties of anemia in which the condition of the blood and the resulting symptoms constitute the important and conspicuous clinical features, while in the latter the state of the blood is subordinate to that of other tissues. He does not regard infantile pseudoleukemia and splenic anemia as definite forms of disease.

METHODS OF EXAMINATION OF THE BLOOD.

E. Biernacki³ discusses the value in practical medicine of **sedimentation** of the blood for the determination of the volume of corpuscles in the serum. He has found that in hysteria, neurasthenia, and severe nervous conditions there is constantly an alteration in the relations of the bulk of the serum and corpuscles, and he concludes that this may have some value in excluding or detecting simulation of nervous diseases. He states, however, that he cannot urge the method as applicable in ordinary clinical investigations.

W. K. Hunter⁴ has a ready method of **fixing blood-films**, first passing them through a flame and then putting them in 70% alcohol. He has been able to stain the granules of the marrow-cells with either eosin or methylene-blue, depending upon the amount of the stain he put into his mixture. He therefore believes that these granules are really amphophile. He thinks that the granules are the knots in the network of the stroma, agreeing with Gulland in this; but he has never been able to discover the connecting filaments in eosinophiles.

W. Mackie⁵ has a ready method for the **estimation of the amount of iron** in a measured drop of blood. He obtains 40 c.mm. of blood from a finger-prick, drawing it into a graduated pipet. He then puts it into a platinum dish and heats it until only the ash remains. This is then dissolved in HCl and washed into a Nessler cylinder, 1 c.c. of a 4% solution of potassium thiocyanate added, and the whole diluted to 10 c.c. The color of the solution is then compared with the color produced by a solution containing a known amount of iron, and the amount of iron in the original solution is thus calculated. His investigations of this method show that it yields about the same results as those that are more elaborate. Multiplication by 11 of the amount

¹ Arch. f. Verdauungskrankh., Bd. iv., Heft 1.

² Jour. Am. Med. Assoc., July 24, 1897.

³ Deutsch. med. Woch., Nov. 5 and Dec. 30, 1897.

⁴ Glasgow Med. Jour., May, 1898.

⁵ Lancet, Jan. 22, 1898.

estimated gives the amount of hemoglobin. A. Jolles¹ reports 3 cases in which he determined the amount of iron in the blood by his own method and by gravimetric methods. The difference was but from 2% to 6%, and the method seems from these results to be entirely satisfactory for clinical use. [Those who advocate methods for estimating the amount of iron in the blood should devote themselves to showing the significance of variations in its quantity in clinical conditions.]

C. S. Engel² has made a slight modification of the Loewy-Zuntz method for determining the **alkalinity** of the blood. His chief change consists in using a very dilute solution of tartaric acid—*i. e.*, $\frac{1}{15}$ normal. He uses lacmoid paper as an indicator, and stops his titration when touching this paper with a drop of the mixture being titrated causes a bright-red line to form around the edge of the drop. He claims that this renders the method extremely accurate.

W. C. Posey³ has frequently noted muscular asthenopia among the **ocular manifestations** of anemia. In 19 cases of chlorosis which he examined he found ocular manifestations more frequent than he expected, most commonly finding a dull, lusterless, grayish-white optic nerve. There was no marked swelling or true neuritis in any case. In many cases of secondary anemias, mainly resulting from heart- and stomach-affections, he found pallor of the discs, narrowing of the vessels, and lighter blood-columns with such regularity as to make him believe that the anemia was the cause.

S. M. Hamill⁴ has investigated the condition of the **salivary secretion** in anemias. Twelve cases were examined, with such results that the author believes that anemia of itself does not give rise to any notable change in the activity of the saliva. In the one case of leukemia examined, both the quantity and the amylolytic action were normal. Of 6 cases of chlorosis, 4 were entirely normal, 1 was slightly deficient in diastatic action, and 1 somewhat deficient in both respects. One case of pernicious anemia was normal in both respects; while a second case had a decided sialaporia, but the diastatic action was normal.

H. Weber⁵ recommends a seaside-resort for anemic cases of torpid temperament, while more excitable cases should seek moderate mountain-elevations. If there is marked dilatation of the heart, mountain-resorts of about 3000 feet elevation are best. **Change of climate** is valuable in all cases, and those who have become ill at the seaside should go to the mountains, and *vice versa*; but often weakness is so great that a journey should not be attempted at once. The use of mineral waters is not so important as change of climate, and chalybeate springs are not always best. The water should be chosen according to the condition of the patient, particularly the condition of digestion.

Battistini and Scalone⁶ caused anemia in dogs by injections of perodin, and then used **transfusion**. They found this procedure useless if the anemia was extremely advanced and the animals nearly dead. In such cases transfusion of blood caused severe toxic symptoms and the animals died, perhaps after temporary improvement. When the destruction of blood has ceased and regeneration is beginning, transfusion causes improvement and may cure the condition, even though there are sometimes slightly toxic symptoms. The free injection of physiologic salt solution after profuse bleeding does not distinctly modify the progress of the anemia. [These experiments do not seem likely to throw much light upon the value of transfusion in ordinary anemia.]

¹ Deutsch. med. Woch., Feb. 17, 1898.

² Jour. Am. Med. Assoc., July 24, 1897.

³ Practitioner, No. 351, p. 235, 1897.

⁴ Berlin. klin. Woch., Apr. 4 and 11, 1898.

⁵ Phila. Med. Jour., Jan. 22, 1898.

⁶ Arch. Ital. de Biol., T. 28, fasc. 1.

Formeaux¹ discusses the value of **subcutaneous injections**, basing his remarks upon a study of their clinical and experimental effects. He considers them quite as efficient as intravenous injections and much less dangerous. They should be given in the quantity of about one pint, and as often as may be indicated if there has been severe hemorrhage. Neither fever nor subnormal temperature contraindicates the injections. They have a valuable place in the treatment of anemic patients, both before and after surgical operations, acting as a general tonic at either period. Mourette² presents a study of cases treated by intravenous and subcutaneous injections, concluding that the latter should be employed if it is possible to wait for its somewhat slower effects, as it is equally sure and has caused no bad results.

CHLOROSIS.

Étiology.—Gilbert³ considers chlorosis a separate primary disease of **hematogenesis**, the causation of which is chiefly to be found in hereditary influences, though acquired diseases may have influence. He considers it a result of degeneration, owing to the frequent association of hypoplasia of the circulatory and generative organs. Goloubine⁴ considers chlorosis a primary disease, and thinks the digestive and nervous symptoms are collateral, as are those of the circulatory and generative organs. It is, in his belief, **hematogenic**, though it may appear as the sequel to various other diseases. Women are especially affected, because they have normally less energetic blood-production than have men.

N. de Dominicis⁵ has found that almost all of his cases of chlorosis were preceded by habitual disturbances of digestion; that the blood-condition was in direct relation to such **digestive disturbances**; and that recurrences seemed to depend upon them. [One might say with equal pertinence that the digestive disturbances are proportioned to the degree of anemia. The nature of the disease cannot be determined in this easy fashion.] He considers the disease, however, a constitutional affection, and it may be brought forth by many other conditions than digestive disturbances. Direct transfusion of dogs' blood has been useful in his hands, but he believes that venesection works chiefly through suggestion.

Capitan⁶ draws attention to the frequent **enlargement of the thyroid** in chlorosis, and expresses his belief that the disease is sometimes dependent upon abnormalities in this gland, and may, at times, be an exhibition of the intoxication which commonly produces Graves's disease. He considers that the great frequency of the association of the **goiter and chlorosis** proves that they are not simply coincidences, and his belief is supported by the fact that iodine, or sometimes iodothyroid, causes the symptoms of chlorosis to disappear.

R. Blondel⁷ advances the theory that chlorosis is an **intoxication** from faulty metabolism, owing to the nondevelopment of the secretion of the **thymus and ovary**, since he believes these two glands have an antitoxic effect upon the products of faulty metabolism. Three young girls, who early ceased to menstruate, showed marked symptoms of chlorosis, and each was given raw thymus in 5-gm. daily doses, with excellent results.

Etienne and J. Demange⁸ believe that an internal **ovarian secretion**

¹ Thèse de Paris, 1897.

² Ibid.

³ Proc. Internat. Med. Congress, Moscow, 1897.

⁴ Ibid.

⁵ Wien. med. Woch., Sept. 25, 1897.

⁶ Gaz. hebdom. de Méd. et de Chir., Dec. 23, 1897.

⁷ Bull. gén. de Thérap., liv. 8, p. 233, 1897.

⁸ Quatrième Congrès Franc. de Méd. int., 1898.

exists, and that insufficiency in the quantity of this secretion leads to an auto-intoxication which produces chlorosis. Sometimes the thymus is also at fault. In 17 cases they have seen the symptoms disappear rapidly after the administration of ovaries. [Better evidence is needed to establish the theory that disturbed function of the ovaries and thymus is at fault.]

Molle¹ directs attention to an affection resembling **chlorosis in boys**, which he has repeatedly observed at about the age of puberty. They exhibit general weakness, nervous disturbance, digestive derangements, palpitation of the heart, and a venous bruit over the femorals which he considers important in diagnosis. He has never seen this sign in chlorotic girls.

S. Mackenzie² reports the case of a girl, 20 years old, who had chlorosis. After going to bed as well as usual she was found comatose; both legs were paralyzed; there were athetoid movements of the arms and conjugate deviation of the eyes. Postmortem there was found a focus of red softening on each side of the cerebrum, involving the internal capsule. There was no evidence of disease of the vessels at the base of the brain, but the probable explanation seems to be **thrombosis of the lenticulostriate** or of other small vessels.

Treatment.—Hayem³ insists upon the importance of **rest** in the treatment of chlorosis. One of the indications for rest that he sees in chlorotic patients is, that when they are allowed to go about the blood-pigment in the urine and feces is much increased over the amount present when they are at rest. Repose also relieves the neurasthenia which is a frequent accompaniment of chlorosis, and admits of the patient leaving off her corset, thus relieving the pressure upon the stomach. The other important points in treatment are a careful diet, which, Hayem believes, should at first consist of milk, soups, and raw meat, gradually increased, until after 4 or 5 weeks ordinary diet may be used; and, as a third indication, he mentions iron in a readily assimilable form. The preparation which he prefers is ferrous oxalate. He has not much to say in favor of the carbonate of iron, as he has found that it takes a longer time to cure the disease, and it must be given in larger and, consequently, more unpleasant and more irritating doses.

W. Edgecombe⁴ has investigated the **effect of exercise** upon hemoglobin, and finds that normally there is a fall in the day and a rise during the night in the individual value of the corpuscle, showing some daily destruction and regeneration of hemoglobin. This is increased by active exercise, the destruction somewhat more than the production. Massage decreases the volume of the blood, but has no effect upon the amount of hemoglobin; rest reduces the amount of destruction of hemoglobin. These observations were made upon a healthy subject, and do not, therefore, show what actually takes place in anemia, but they indicate that rest may in the future be definitely proved useful in building up hemoglobin.

Stark⁵ states that large **injections of hemoglobin** may be used without any serious results if the substance be taken from animals of the same species as the one into which it is injected. He finds, for instance, that hemoglobin taken from dogs and injected into dogs is borne in large amounts, with the production of only a slight hemoglobinuria; while either horses' serum containing hemoglobin, or pure hemoglobin from the horse, injected into dogs, caused grave hemoglobinuria and death with anuria. The hemoglobin is undoubtedly excreted through other channels than the urine, since Stark has found it in the intestinal mucus and the peritoneal fluid, and granules of iron were

¹ La Loire Méd., Nov. 15, 1897.

² Méd. mod., No. 90, p. 713.

³ Practitioner, Feb., 1898.

⁴ Brit. Med. Jour., June 25, 1898.

⁵ Münch. med. Woch., Jan. 18 and 25, 1898.

found near the seat of injection, both in the leukocytes and in connective-tissue cells; and the substance is probably secreted through still other channels besides those mentioned. Starck has used injections in human beings of as much as 10 c.c. of a 10% solution of hemoglobin obtained from horses, with no ill-effect, excepting slight pain, and he thinks that this method is harmless and should be tried.

L. Fornaca and F. Micheli¹ have used **intravenous injections** of the **ammoniocitrate of iron** in 7 cases of chlorosis, administering a 5% solution. The injections were well tolerated and caused no marked evil results; but the effect upon the disease was somewhat irregular, and it did not always cause improvement. Romberg,² in discussing the treatment of chlorosis with iron, says that in using carniferin and saccharated carbonate of iron in a large number of cases, he obtained practically the same results. In fact, the inorganic compound caused a somewhat more rapid cure. Buzdygan³ explains the various effects of iron in chlorosis by the consideration of the condition of the gastric juice. If the secretion of gastric juice is normal, he finds that iron is well borne and causes improvement. If there is an excess of HCl, the iron increases this excess and causes distress, and aggravates the dyspeptic symptoms. If the secretion is diminished, the iron may do especial good by increasing secretion.

Kunkel⁴ has investigated the question of the **absorption of iron** by giving young dogs a pure milk-diet, which contains but little iron, and determining the amount of iron in their blood. When iron was added to their nourishment he found that if it were in inorganic form the amount of iron in the blood increased, while when administered in organic compounds the amount in the blood even decreased. P. Hári⁵ has investigated the question of the absorption of iron in the stomach and duodenum. It was readily determined that this takes place in the duodenum, but any iron-reaction in the gastric epithelium was only obtained when the whole organ was immediately put in Hall's solution, in order to bring out certain small areas of dark color which were otherwise invisible. These areas showed an iron-reaction in the epithelium, and since this reaction was absent from the cells of animals which had not taken iron, as well as from those of a stomach into the cavity of which iron had been introduced after death, Hári concludes that the stomach undoubtedly absorbs iron, though to a lesser degree than does the duodenum. He thinks that the technic he used would have permitted this conclusion if it had been used in previous work, which has shown apparent lack of absorption of iron from the stomach.

P. W. Latham⁶ believes that **constipation** largely influences anemias, in that it results in the formation of sulphuretted hydrogen from the decomposition of the intestinal contents, and this then converts the organic compounds of iron into sulphids, and so prevents their absorption. Hence he recognizes the value of **laxatives** in the treatment of anemias. [This is an old theory that has been disproved.]

G. Maurange⁷ has used **fresh ovaries** with success in the treatment of 2 cases of chlorosis.

PERNICIOUS ANEMIA.

G. Hayem⁸ gives the record of an interesting case of extreme symptomatic anemia which occurred in a woman of 32 years, subsequent to pregnancy, and

¹ Giornale d. Accad. di med. di Torino, June, 1897.

² Wien. klin. Woch., No. 31, 1897.

³ Arch. f. Verdauungskrankh., Band iv., Heft 2.

⁴ Gaz. hebdom. de Méd. et de Chir., July 18, 1897.

⁵ Berlin. klin. Woch., July 5, 1897.

⁶ Berlin. klin. Woch., Sept. 6, 1897.

⁷ Practitioner, Oct., 1897.

⁸ Ibid., May 22, 1898.

after she had had repeated hemorrhages. She was markedly icteric, and there were areas of deep pigmentation over the skin, which suggested Addison's disease; the spleen and liver were both greatly enlarged, and the red corpuscles were reduced to 651,200, while the leukocytes were not altered in number. There were also symptoms of chronic atrophic gastritis. Hayem divides cases resembling pernicious anemia into the protopathic and the deuteropathic, or secondary, and he includes the case reported among those of the second class. In the blood from two punctures of the spleen, in this case, there were found in each instance diplococci which presented the appearance of the diplococci of Fränkel, and when inoculated into a mouse caused death in 28 hours; pneumococci were found in the animal's organs. From this it seems probable that it was an **infectious disease** in a woman possibly the subject of Addison's disease, and that the infection arose in all probability at the time of childbirth. She had improved considerably at the time of the report, but the jaundice, in particular, persisted.

Taber¹ reports a case of pernicious anemia associated with very severe diarrhea, in which there were found at the postmortem two **strictures of the small intestine**, with ulceration about them which was neither syphilitic nor tuberculous. The author notes that this lesion has frequently been found in cases of pernicious anemia, and considers the disease in these instances due to absorption of toxic material from the intestine.

B. Bramwell² records a case of progressive pernicious anemia of remarkable **rapid development**. The man, within 3 months after the first appearance of illness, was seen to be profoundly weak and somewhat emaciated; he had disturbance of his digestive organs and deep jaundice, together with such marked anemia that the red corpuscles were reduced to 810,000 and the hemoglobin to 20%. The leukocytes were not increased. There were no nucleated red corpuscles, but a large number of Eichhorst's deeply pigmented corpuscles were present. The blood did not show any organisms in cultures and parasitic organisms were absent from the stools. There were retinal hemorrhages, but no optic neuritis. The liver was distinctly enlarged, while the spleen was of normal size. The urine contained bile and casts. He was put upon Fowler's solution, the dose being rapidly increased, until he took as much as 60 minims a day. During this treatment the urine frequently contained a large amount of uric acid, and there was once an herpetic eruption on the forehead. Practically entire recovery ensued, so that within 6 weeks his blood-count had increased to 4,010,000 red corpuscles, with 88% of hemoglobin.

Sgrosso³ studied **the retina** in a case of pernicious anemia, and found it swollen and exhibiting small hemorrhagic areas of brownish color, sometimes showing a white center. Both papillæ showed edema and whitish discoloration. The histologic examination after death showed edema of the papillæ, enlargement of the fibers, hemorrhage, new formed vessels, and infiltration of leukocytes. Small cells were found lying in direct connection with the fibers of the optic nerve, but these were found to be red corpuscles containing nuclei, and not, as some authors have previously stated, retinal fibers undergoing degeneration.

Patren⁴ publishes the results of examination of the **spinal cords** from 9 cases of pernicious anemia. In 2 of these cases there had been symptoms during life of disease of the cord. In 1 these were chiefly motor and sensory weakness, ataxia, loss of knee-jerks, and, later, incontinence of urine. In this

¹ Berlin. klin. Woch., No. 30, 1897.

² Gaz. degli Osped. e delle Clin., Sept. 12, 1897.

³ Lancet, July 24, 1897.

⁴ Nord. Med. Arkiv., 1898.

case the columns of Goll and Burdach were almost completely degenerated, most markedly below. The second case had had increasing paralysis of the legs, with some spasticity. The same columns were found degenerated, and with this some degeneration of the right crossed pyramidal tract. Of the 9 cases, as a whole, there was in 4 hyaline degeneration of the vessels of the white substance; in 5 he found small hemorrhages, and in 2 cases, besides those already mentioned, there were chronic degenerations. In 2 cases of Hodgkin's disease the spinal cord presented no change excepting a few small hemorrhages. J. M. Clarke¹ records the results of microscopic examination of the spinal cords from 2 cases of pernicious anemia. In the first the changes were almost entirely confined to the gray matter, causing extensive degeneration of the posterior columns throughout the whole length of the cord and some small areas of degeneration in the posterior part of the lateral columns in the lower dorsal and upper lumbar regions. In the second case the gray matter suffered chiefly. There was marked injection of the vessels, and many small hemorrhages into the gray matter were found, principally about its central portion and in the posterior part of the anterior cornua and in the neighborhood of the commissure. In some places the gray matter was granular, partly disintegrated, or sclerosed. The nuclei of the glia-cells were somewhat increased in number.

LEUKEMIA.

T. H. Pfeiffer² reports upon the quantity of **fibrin in the blood in leukemia**. The amount in 3 cases was about the same, and was slightly in excess of the normal quantity, but was much less than that observed in leukocytosis in other conditions. He concludes that either there is a smaller quantity of fibrin-factors in leukemia, or there is present a substance which prevents coagulation. There is certainly no lessening in the destruction of leukocytes, as the state of the urine in this disease demonstrates. The prevention of coagulation, if the small amount of fibrin be due to this cause, is not due to peptone. These substances may delay coagulation, but do not prevent it. W. H. Thomson and J. Ewing³ record an interesting case of acute leukemia in a woman of 21. She had had sore throat 6 months before observation, and this had been followed by repeated painful red swelling of the arm, and later by pains in the trunk and limbs. The woman was admitted with a temperature of 105.6° F., and looked as if she had had severe internal hemorrhage. The spleen was enlarged, but the lymphatic glands were not. The fever continued until the time of death, which was 11 days after admission; during this time she vomited repeatedly. The red corpuscles were reduced to 1,290,000; the hemoglobin reached but 20%, and the leukocytes were greatly increased in number; they were not counted, but were estimated at 50,000. Myelocytes reached as high a point as 32%; there were no mast-cells. The postmortem examination showed that the spleen, lymphatic glands, liver, and bone-marrow were infiltrated with large mononuclear round cells. In the liver the cells showed marked karyokinetic figures, and there were foci of necrosis similar to those seen in rabbits after injections of bactericidal toxins. No bacteria were found, however. The character of the onset suggested an infectious origin. J. Friedenwald and S. McCleary⁴ record a case of acute leukemia in a child 11 years of age. There were the general signs of anemia, together with great enlargement of the spleen, some increase in the size of the liver, and general enlargement of the glands. Blood-examination showed only

¹ Brit. Med. Jour., Aug. 7, 1897.

³ Med. Rec., Mar. 5, 1898.

² Centralbl. f. innere Med., Jan. 8, 1898.

⁴ Med. News, Nov. 6, 1897.

800,000 red cells, but there were 1,200,000 leukocytes. The hemoglobin was 20%. 97.1% of the leukocytes were small lymphocytes. Myelocytes were present in the proportion of 0.3%. The polymorphous neutrophils were but 0.2%, and the eosinophils were 0.1%. The authors could find no records of other cases in which the number of leukocytes so far exceeded that of the red corpuscles.

J. B. Herrick¹ records the case of a man of 27, whose illness began with sore throat, followed by persistent swelling of the cervical glands. After this he became rapidly and progressively more pallid and feeble, and the spleen became enlarged, as did the glands in general. The red blood-corpuscles were reduced below 1,000,000, while the white were 60,000 per c.mm. Nucleated red corpuscles were present to the number of 1800 per c.mm. The mononuclear forms of leukocytes made up nearly 99% of all these cells, over 86% being lymphocytes. Bacteriologic examination of the blood after death showed the presence of a virulent **streptococcus**. The case seemed to Herrick a typical one of acute leukemia.

H. Van Rensselaer² records an instance of what he believes was acute **lienedullary leukemia**. The illness followed an injury, and there were, besides the general symptoms common to anemias, enlargement of the spleen and liver and a leukocytosis of severe degree, the white cells numbering 1,095,000, while the red were reduced to 2,790,000. Myelocytes were the most abundant of the white corpuscles, but a differential count is not recorded. There was no enlargement of the glands. After much general improvement the white corpuscles were reduced to 160,000, but the patient died suddenly.

L. Pollman³ records a case of **congenital leukemia**. The child was in ill-health at the time of birth, and when 14 days old the proportion of leukocytes to red corpuscles was as 1 : 8, and the liver and spleen were greatly enlarged. Petechiæ appeared, the condition grew worse, and death occurred with fever. At the autopsy, beside the changes mentioned, the lymphatic glands were found to be greatly enlarged and the bone-marrow was splenified. Most of the leukocytes were of the mononuclear type. There was an endocarditis present, which makes the author suspect that the condition was infectious, but cultures were entirely sterile. [Notwithstanding the remarkable condition of the blood, this case cannot be received as undoubtedly one of leukemia.]

G. G. Belsheim⁴ records 2 cases of leukemia treated with **calf's spleen**. One case died without improvement at any time, while the other seemed about stationary.

PSEUDOLEUKEMIA.

G. Jawein⁵ records, under the name of **pseudoleukemic splenic anemia**, the case of a man of 25 years, who, after a wetting, had chills and rheumatic pains, followed by enlargement of the abdomen and splenic enlargement. The main symptoms were marked anemia, with normal temperature, and a very large and painless spleen. The liver was likewise enlarged, but there was scarcely any enlargement of the lymph-glands. The red cells were much decreased and showed changes in size, and there were numbers of nucleated rods which showed signs of degeneration and regeneration. The hemoglobin was not proportionately decreased. There was no leukocytosis, but a few myelocytes were present. H. N. King⁶ records an instance of what he terms

¹ Jour. Am. Med. Assoc., July 24, 1897.

² Münch. med. Woch., Jan. 11, 1898.

³ Berlin. klin. Woch., Aug. 16, 1897.

⁴ Albany Med. Ann., Nov., 1897.

⁵ N. Y. Polyclinic, Dec. 15, 1897.

⁶ Med. News, Mar. 5, 1898.

splenic anemia, which occurred in a young Swedish woman after an acute pharyngitis. There was reduction of the red cells to 1,875,000, and of the hemoglobin to 35%, while the leukocytes were not increased. The spleen was much enlarged and the skin was of a lemon-yellow tinge. Later in the disease myelocytes were discovered, and the lymphocytes became increased in number. Treatment caused improvement.

J. S. Fowler¹ reports 7 cases of anemia which occurred in children between 10 and 18 months of age. The red blood-corpuscles were reduced as low as 2,800,000. In 1 case the hemoglobin sank to 28%. There was leukocytosis, which in 1 case reached 45,000. The spleen was enlarged, usually very markedly. The red corpuscles showed nucleation and changes in shape. Of the 3 cases which were followed, 2 recovered and 1 died from pneumonia. In all but 2 cases the condition was associated with severe rickets.

R. Abrahams² reports, as a case of **Hodgkin's disease with associated neuritis**, a case in which a man of 35 first presented himself with fleshy lumps at the junction of the head and neck, and subsequently distinct evidences of multiple neuritis of pseudoataxic form. He finally suffered from progressive enlargement of the lymphatic glands of the neck and axilla and of the mammary glands. The first enlargements of the neck were posterior and on the right side, at the junction of the head and neck; one of these reached the size of a small orange. The second time the patient came under observation there were general weakness, shooting-pains, ataxia, loss of knee-jerks, and, upon suggestion, a girdle-sensation. The pupillary reactions were normal, the sphincters were active, and electric tests of the muscles were negative. Two weeks later the glandular enlargements began, and involved the glands already mentioned, as well as the parotid glands, at the upper border of which two enlargements became visible. The mammary glands finally reached the size of large oranges. Examination of the blood was imperfect, and showed nothing. [The nature of this case is very doubtful. It can hardly be called Hodgkin's disease, excepting in the absence of a better name or more satisfactory examination.] C. H. Lewis³ reports a case of Hodgkin's disease accompanied by pulmonary tuberculosis. The patient was a woman, whose cervical glands began swelling during pregnancy. The axillary and inguinal glands subsequently became tumefied, and she lost flesh and strength constantly, subsequently exhibiting the signs of pulmonary tuberculosis, which resulted in her death. Postmortem the spleen was much enlarged, all the glands throughout the body were increased in size, and there was pulmonary tuberculosis. Microscopic examination of the lymph-glands showed proliferation of round cells without invasion of surrounding tissues, and there was much new connective tissue.

M. H. Menko⁴ records two cases of **acute pseudoleukemia**. The first appeared in a young woman in the eighth month of pregnancy, first in the form of a tumor in the left axilla. This was removed by operation, but nearby glands became involved, fever and anemia developed, and the condition grew grave. Afterward, complete recovery seemed to follow; but the symptoms recurred, severe diarrhea and bronchitis came on, and the condition caused death. The second case, in a man of 35, had chronic constipation. The spleen and liver were found greatly enlarged, and the blood was very anemic. The lymphatic glands did not swell, but death occurred. [The grounds upon which the diagnosis was made in the second case are of doubtful value, to say the least.]

¹ Scottish M. and S. Jour., May, 1898.

² Med. Rec., Aug. 28, 1897.

³ Med. News, Jan. 1, 1898.

⁴ Deutsch. med. Woch., Mar. 10, 1898.

R. E. Horan¹ records a case of pseudoleukemia in a woman who had chronic mania. The glands became generally enlarged about a month before death, and the liver and spleen increased in size. There were marked anemia, vomiting, and some fever. The glandular enlargement was improved by the use of arsenic, but the case ended in death, with hemorrhages from the nose and stomach. Bone-marrow had been without effect.

THE HEMORRHAGIC DISEASE.

Apert and Rabé² report a case of chronic hemorrhagic disease which resembled **Werlhof's disease**, excepting in its chronicity. The patient, a boy 14 years of age, had hemorrhages from the mucous surfaces and into the skin. These symptoms disappeared after treatment with citric acid and calcium chlorid. The authors believe that this form of purpura is not either ordinary purpura hemorrhagica or infectious purpura, but resembles Werlhof's disease, and is distinguished by the absence of retractile power of the blood-clot and of exudation of serum. Calcium chlorid is very valuable in treatment.

Hamilton and Yates³ record a case of purpura hemorrhagica occurring in a general infection in a previously healthy student 22 years of age. The first symptom noticed was an eruption of red spots over the legs, which spread over the body, and which appeared upon the slightest injury. The patient did not feel ill until the fourth day, when he spat blood, and subsequently lost large quantities of blood from the mucous membranes. The spots became larger and he had fever. There was no leukocytosis, and cultures from the blood were negative. The patient died on the twelfth day. At postmortem there was general visceral hemorrhage, and cultures were obtained of the *Bacillus aerogenes capsulatus*, the *Streptococcus aureus*, and a small bacillus, which was fatal when injected into a rabbit. The most probable cause of the infection seemed to them to be the **staphylococcus**.

W. Johnson⁴ reports a case of **rheumatic purpura** in a boy of 12 years. The boy was anemic, poorly developed, and complained of pain in the right knee, left elbow, back, and abdomen. There were slight rheumatic swelling of the joints and moderate fever. Subsequently the disease divided itself into three successive periods, separated by intervals of 8 or 10 days of comparative health. Each exacerbation was marked by paroxysms of colic, with or preceded by rheumatic pains in the joints, and succeeded by a purpuric eruption. Le Noir and H. Claude⁵ saw a case of purpura in a man 27 years of age, who had extreme anemia. He was a dyer, and was constantly exposed to the vapors of benzene, and it was thought probable that the purpura was due to poisoning from these vapors.

Santesson⁶ has observed 9 cases of poisoning, with 4 deaths, in which the symptoms were headache, vertigo, vomiting, anemia, and marked subcutaneous hemorrhages or bleeding from the mucous membranes. There was no jaundice. The cause was believed to be **benzol** in the benzene which was used largely in the factory in which the patients worked.

C. P. Kornreich⁷ records the case of a man of 25, in whom a marked purpuric eruption over the body and extremities persisted in spite of various methods of treatment. He complained of severe headache and gave a **syphilitic history**. The purpura disappeared after a few weeks of specific treatment.

¹ N. Y. Med. Jour., Mar. 5, 1898.

² Bull. Méd., No. 94, 1897.

³ Montreal Med. Jour.

⁴ Med. News, Jan. 1, 1898.

⁵ Soc. Méd. des Hôp., Oct. 29, 1897.

⁶ Proc. Internat. Med. Congress, Moscow, 1897.

⁷ Med. Rec., Feb. 26, 1898.

A. Pigot¹ used injections of **artificial serum** in a case of purpura hemorrhagica which had fallen into a very grave condition: 250 c.c. were given, and within 48 hours the patient appeared as if life had been renewed.

F. A. McGrew² reports 42 cases of **scurvy** which occurred epidemically in Chicago in 1894. Almost all of the patients were Poles, who had recently come to this country. They were well fed, but lived almost entirely upon meat, strong coffee, and bread. From the fact that scurvy occurred in these people while they were using this diet, which contained a large percentage of uric acid and xanthin; and because joint-manifestations are frequent in scurvy, and hemorrhages in the skin frequently occur in rheumatism; and because treatment allied to the treatment of rheumatism cures scurvy, McGrew believes that the cause of both is uric acid. [Some better proof will be required to establish this view.] Of interesting points in the epidemic, it was noted that a number of cases had marked induration, sometimes even interfering with flexion at the knee-joint. 12% of the cases had absolutely no hemorrhage from the gums. Of 20 cases in which the urine was examined, only 1 had albumin; in this case but a trace. A history of trauma was sought for, but not discovered. Constipation was practically always present.

M. H. Fussell³ records 2 cases of **hemophilia** in brothers, in whom blood-examinations were made. The leukocytes were found slightly increased (14,000 and 15,000 per c.mm.), while the red cells were moderately reduced. J. E. Shaw⁴ reports an instance of a man of 30, who had pronounced hemophilia all his life, and had had repeated attacks of joint-swellings, sometimes associated with effusion of blood. At the time reported, the appearance of the joints was like that of rheumatoid arthritis, excepting that the fingers and toes had escaped completely. S. J. Ross⁵ records a case of hemophilia which was remarkable in that the subject was 28 years old, and in that there was a hemarthrosis, which subsequently suppurated. He suggests that all hemophilias should have the word "bleeder" tattooed into their skins. [In connection with this suggestion it might be recalled that large hemorrhages sometimes follow pin-pricks and similar slight injuries in hemophilias.] W. J. Robinson⁶ records an instance of renal hemophilia in a boy 4 years of age, which lasted for over 10 days, but was finally controlled by the administration of hydrastin and ergot.

Delace⁷ used **thyroid gland** in treatment of a case of hemophilia in which profuse hemorrhages from various sources, particularly from the uterus, had caused profound anemia. The condition improved almost immediately after exhibition of the thyroid. Combemale and Gaudier⁸ used thyroid treatment in a case of hemophilia in a woman 38 years of age. The bleeding was from the larynx and was extremely grave, but after resisting other treatment subsided in response to thyroid medication. [Perhaps this is a case of *post hoc ergo propter hoc*.]

ADDISON'S DISEASE.

Swale Vincent⁹ reviews the recent opinions upon the functions of the suprarenal capsules, concluding, in brief, that the organs consist of two separate glands, the cortex and the medulla. The latter contains a chromogen, possibly

¹ Gaz. hebdom. de Méd. et de Chir., Oct. 17, 1897.

² Medicine, Nov., 1897.

³ Brit. Med. Jour., Oct. 30, 1897.

⁴ Bristol Med.-Chir. Jour., Sept., 1897.

⁵ Brit. Med. Jour., Apr. 2, 1898.

⁶ Med. News, July 24, 1897.

⁷ Jour. de Méd.

⁸ Quatrième Congrès Franç. de Méd. int., 1898.

⁹ Birmingham Med. Rev., Apr., 1898.

allied to the tannin in coffee, and an active principle, which seems to be closely connected in its chemical characters with piperidin. The latter has a remarkable effect upon the muscular tissues, increasing their tone; and when injected intravenously causes an enormous rise of blood-pressure. There is a central effect manifested in the production of paralysis, but whether this is due to the same active principle or another is not determined. The function of the cortex is not yet known. T. R. Bradshaw¹ reports 2 cases of Addison's disease. The adrenals were found caseous in one and fibroid in the other. Henry Waldo² gives brief notes of a case of Addison's disease. In the postmortem examination the suprarenal glands were found entirely caseous, while the solar plexus and the sympathetic ganglia were bound down in a dense mass of fat and fibrous tissue.

W. Ebstein³ describes a **symptom-complex** which he has seen in the last stages of Addison's disease, and which **greatly resembled peritonitis**, and was so diagnosed in his first case particularly, in which Addison's disease was not recognized during life. The patients have pain and tenderness in the abdomen, with anxiety and collapse, and the general appearance of peritonitis. There was no lesion discovered at the autopsies which would explain these symptoms.

Trebitsch⁴ records a case of Addison's disease with **unusual pigmentation**. There were numerous brown or blackish spots, which varied from a minute size up to that of a millet-seed, and were scattered freely about over the face and eyelids. There were none on the conjunctivæ; but similar though larger patches were seen on the thorax and legs, and there were some areas of pigmentation on the lips. There was found at autopsy a primary tuberculosis of both adrenal glands. The case was interesting, especially because of the fact that the spots of pigmentation did not run together, but remained entirely isolated up to the time of death.

N. B. Delamater⁵ had the urine of 2 cases of Addison's disease examined to determine the relation between the **phosphoric acid and urea**. In the first case this was 1:15; in the second 1:25. The normal ratio is 1:8 or 1:10, and in 500 or more analyses Delamater has never seen another case in which the conditions described here were present. Hence, the results correspond with Zuelzer's, and he believes this variation in the relation of phosphoric acid and urea is a symptom of importance.

Treatment.—L. W. Schwab⁶ records 2 cases of Addison's disease which occurred in brothers 55 and 57 years of age. For a time dried **suprarenal capsules** from sheep were administered, but the general condition of the patients failed so distinctly that the treatment was discontinued. An autopsy in 1 case showed tuberculosis of the glands. C. W. Suckling⁷ treated a man of 49, who had well-marked Addison's disease, with tablets of suprarenal gland, beginning with 10 gr. daily and increasing up to 200 gr. These doses caused a little pain in the back, some soreness of the tongue, and a profuse growth of hair on the back, but otherwise no ill-effects. There was extremely striking improvement, and at the end of a year the man was entirely well. Bécclère⁸ states that he treated a man with Addison's disease for 3 years with extract of adrenals by the mouth and by injection. The general condition improved, but the pigmentation was little changed. P. Courmont⁹ administered suprarenal capsules subcutaneously to a case of Addison's disease, with

¹ Liverpool Med.-Chir. Jour.

² Deutsch. med. Woch., No. 46, 1897.

³ Hahnemannian Monthly, Oct., 1897.

⁴ Brit. Med. Jour., May 28, 1898.

⁵ Brit. Med. Jour., July, 1897.

⁶ Zeit. f. klin. Med., Band xxxii., S. 163, 1897.

⁷ Jour. Am. Med. Assoc., Mar. 26, 1898.

⁸ Soc. Méd. des Hôp., Feb. 25, 1898.

⁹ Quatrième Congrès Franç. de Méd. int., 1898.

the result that within 24 hours the patient died, with subnormal temperature and great prostration and collapse. He considered death due to intoxication, and believes that the subcutaneous use of suprarenal gland should not be continued. Bécélère¹ used suprarenal gland with success in a case of Addison's disease. The subject was a man 28 years old, who had early tuberculosis of the lung and the typical symptoms of Addison's disease. The fresh gland was used in doses of from 15 to 20 gm. daily, and, added to this, he for a time received hypodermic injections of the glycerin-extract. It was interesting that the treatment was continued for 5 months, and there was no improvement during this time; but after its discontinuance he began to gain strength rapidly, the pigmentation decreased, and he became so much improved that he was able to resume work, and remained well 3 years after treatment, excepting that he still had tuberculosis. Bécélère admits that it is not certain that the improvement was actually due to the suprarenal gland, but he believes that it influenced the improvement. He notes that the suprarenal gland seems to cause some compensatory hypertrophy of those portions of the patient's suprarenal glands which have remained healthy, and does not act directly; therefore its influence is slower than that of thyroid treatment. In discussing this paper, Hayem stated that he had treated a case of Addison's disease with the fresh gland, with the result that there was distinct improvement of the general health, but the pigmentation remained unchanged, and the patient died 2 years later. Galliard had found the treatment useless in one of his patients. Vidal had given the gland in a case in which there was marked gastrointestinal disturbance, without causing any ill-effect upon the digestive organs and with increase in the strength, but without effect upon the pigmentation. A few weeks later the patient returned, but was intolerant of the treatment and quickly died. F. P. Kinnicutt² has collected 48 cases of Addison's disease which were treated with adrenal gland. Of these cases, 6 seemed cured, 22 were improved, 18 unimproved, and 2 became worse. In many of the cases there was, however, such grave tuberculosis of other organs as to preclude any expectation of marked improvement. Kinnicutt thinks that the treatment may prove useful.

DISEASES OF THE PERICARDIUM.

M. Heitler,³ in experimental work, found that irritation of the pericardium alone caused **irregularity of the heart**, and that certain areas of the pericardium were more sensitive than others, these being chiefly the region along the longitudinal sulcus near the apex. Irritation of the heart-muscle itself did not produce irregular action, nor did irritation of the endocardium or valves. [His work perhaps explains the relation of arrhythmia to disease of certain areas of the pericardium.]

L. Braun⁴ has investigated the cause of the occurrence of **retraction of the apex-beat** with adherent pericardium just after the systole has begun, and not immediately with the systole. This he finds by cardiograms to be due to the fact that the heart normally moves inward and upward directly after the auriculoventricular valves have closed. When the apex-beat cannot be felt, this inward and upward movement occurs directly after the systole, and is the only movement that is appreciated.

Ebstein⁵ records 2 instances of **hemorrhagic pericarditis**. The first

¹ Sem. méd., Mar. 2, 1898.

² Am. Jour. Med. Sci., July, 1897.

³ Wien. klin. Woch., Jan. 20, 1898.

⁴ Ibid., Mar. 17, 1898.

⁵ Deutsch. Arch. f. klin. Med., Band lvi.

patient, who was 51 years old, had had pneumonia 2 months before, and 4 weeks before had been suddenly attacked with pain in the center of the chest. There was increasing prostration up to a day before his death, at which time he went into sudden collapse. There had been no signs of pericarditis during life, but at the autopsy there were found 1300 c.c. of bloody fluid in the pericardium. It seemed probable that the patient had had latent pericarditis for a considerable time, and that the final symptoms were the result of hemorrhage into the sac. The second case was one of sarcoma with an associated hemorrhagic effusion into the pericardium. The most frequent cause of this affection, when tuberculosis and malignant disease are excluded, is an infectious process with marked toxemia. Chronic alcoholism seems to have marked tendency to the production of this disease. In its treatment aspiration seems to be of little value. Ebstein believes that the cases associated with rheumatism may often be prevented or relieved by the continued use of the salicylates.

Pascheles and Paltauf¹ observed an instance of **acquired dextrocardia**. The clinical diagnosis was congenital dextrocardia with acquired aortic insufficiency. The heart was found on the right, and the liver on the same side, both by physical examination and by radioscopy. Postmortem, however, it was found that the heart had been twisted by contracting adhesions, so that its left border was thrown under, and the organ rested in a grooved recess in the liver. There was no congenital malformation of the heart or of the blood-vessels, and it seemed probable, therefore, that the condition was not congenital, but was due to the contraction of adhesions.

J. B. Herrick² gives the record of a case of **concretio cordis**—in which the diagnosis had been made by the history—together with marked enlargement of the heart, retraction of the interspaces and of the xiphoid, paradoxical pulse, and marked venous engorgement of the neck when the patient was recumbent. There were also adherent pleura and paralysis of the left recurrent laryngeal nerve. The latter was due to pressure from fibrous bands and an enlarged left auricle. The concretio cordis was confirmed at autopsy, but there was, besides, a mitral stenosis. During life there had never been either presystolic murmur or presystolic thrill.

R. C. Cabot³ describes the case of a boy of 18, with a liver so greatly enlarged as to cause marked distention of the abdomen. The spleen was not enlarged. The size of the heart could not be determined; but there were no murmurs. At the autopsy there was found obliterative pericarditis. Similar cases are recorded in the literature, in all of which the proper diagnosis was only made at the autopsy. Cabot insists that **obliterative pericarditis** may give rise to **enlargement of the liver**, and may often be suspected on obtaining a careful history and by carefully examining the heart. The disease is more common under 30 years of age, and runs a longer course than does alcoholic cirrhosis of the liver. [Attention has been repeatedly called to the enlargement and cirrhosis of the liver accompanying pericardial disease, and we can confirm the statement of the author that hepatic enlargement is of diagnostic significance.]

F. C. Shattuck,⁴ in writing of the **diagnosis of pericarditis**, states that of 57 cases of pneumonia under his care within 3 years, 20 came to autopsy, and 13 of these had pericarditis. In only 5 cases had it been detected during life. As to the common signs of pericarditis, he states that he does not find the dulness either pear-shaped or pyramidal, but that it is simply that of the normal heart, equally extended in all directions. He has been unable to

¹ Wien. klin. Rundschau, July 11, 1897.

² Boston M. and S. Jour., May 19, 1898.

³ Chicago Med. Recorder, Mar., 1898.

⁴ Ibid., July 8, 1897.

determine any percussion-changes in the back which could be connected with the distention of the pericardial sac. He believes that change of percussion-limits with change in the position of the patient is a valuable sign. Prominence of the precordia is infrequent. Paradoxical pulse was noted in 5 out of 8 cases. Repeated and sudden collapse seems a valuable sign, as it was noted in 6 cases. As to treatment, he is skeptical as to the value of all measures excepting rest and **paracentesis**. Blisters he never uses. He has never regretted tapping, but has often regretted that he has not done so, and he advises it if there seems to be considerable effusion, if the patient is in danger or is not under close supervision, and especially if the case is not complicated. As to the **point of election**, he finds the left costoxiphoid angle useful, thrusting the instrument upward and backward. He has also had success in tapping just inside the outer left limit of the dulness, though empyema once followed tapping at this point. Tapping in the fourth and fifth left interspaces, and in the fourth right, was not very successful. Of 3 tapplings in the sixth left interspace, 2 were successful. In 1 of his cases seropurulent fluid was removed upon tapping, and afterward by incision, recovery following. Pneumococci were found in the fluid. [One of the points brought out by the author seems to us sufficiently important to emphasize. This is the absence of symptoms and physical signs in many of the cases of pericarditis.]

H. A. Hare¹ states that in the attempt to aspirate the pericardium in 2 cases he inserted the trocar into the left ventricle and drew off blood. The patient's condition improved, however, after the tapping in each case; but death occurred from increasing cardiac failure in 36 hours in the second. After a study of the effects of injury of the left ventricle in this procedure, Hare concludes that dangerous symptoms occur only when the nerve-centers are damaged by the wound, or when there is such profound hemorrhage from the wound into the pericardium as could cause heart-failure, or when there is hemorrhage outside the pericardium which causes death from loss of blood. The opening made by a cannula is never large enough to produce hemorrhage from the ventricle. [In 1 case in which we inserted a small needle directly into the left ventricle, no harm of any kind followed.]

DISEASES OF THE HEART.

Methods of Examination.—L. Braun² has studied the **movements of the heart** by means of the kinetoscope, first removing the overlying structures and stitching the sides of the pericardium to the chest-wall. The systole of the left ventricle was especially studied, and it was seen that there was elongation of the anteroposterior diameter of the heart, the ventricle became more circular in shape, and a prominence appeared above the apex near the anterior interventricular groove, while this groove became deeper. When the groove was deepest rotation of the ventricle toward the right, which had begun with the systole, ceased. The heart also moved distinctly forward and upward. The cause of the apex-impulse seemed to be the prominence which has been mentioned. The movements of the heart seem to be due rather to change in shape than change in position, since it is held against the sternum by the pericardium, which is attached to the sternum, and by the negative pressure in the thorax. [The serious and extensive operative procedures which preceded these observations seem likely to have influenced the movements of the heart. The author admits that the various positions in which he placed the animals distinctly modified the character of the cardiac movements, so that there seems

¹ Therap. Gaz., Feb. 15, 1898.

² Wien. med. Woch., Feb. 3, 1898.

to be some doubt as to the absolute accuracy of these experiments in showing the real movements of the heart.]

Henry Sewall¹ has found that varying the **pressure of the stethoscope** is a valuable procedure in diagnosing the nature of affections of the heart. When firm pressure is made the sympathetic vibrations of the chest-wall are cut off, but those brought to the ear by direct conduction are intensified. With pressure, then, one gains a much more accurate idea of the energy of the cardiac contraction, and he believes that one may observe the borders of the heart in this way, since an existing murmur will disappear as soon as the limit of the heart has been passed if the stethoscope is firmly applied to the chest. In aneurysms of the aorta, and in other conditions bringing the vessel in closer contact with the chest-wall, the second sound will be found strong on firm pressure; but in normal conditions firm pressure will make it disappear. Heart-murmurs may, he also believes, be traced to their valves of origin by this method, since pressure causes them to disappear from the region of other valves.

Etiology and Pathology.—F. Harbitz² has made an elaborate study of the pathologic anatomy and etiology of **endocarditis**. With others, he classifies the disease into the infectious and the noninfectious varieties, including in the first those in which there are found various bacteria, but excluding tuberculous endocarditis as not yet a proved entity. He records 54 cases of endocarditis, of which 39 were infectious, 11 being due to streptococci, 5 to pneumococci, 7 to staphylococci, and 2 to gonococci. The last-named organisms were not cultivated, but the bacteria discovered had all the morphologic characteristics of these cocci. Two cases were due to an unknown micrococcus and one to an unknown bacillus. There were 6 cases of infectious endocarditis which had been followed by healing. These cases presented large outgrowths upon the endocardium, and there were degenerated bacterial masses at the borders of the vegetations, but cultures were sterile. He believes these instances demonstrate the curability of infectious endocarditis. There were 15 cases of the noninfectious variety, 5 of which were associated with acute rheumatism and 7 were tuberculous, while the other 3 were found in connection with other chronic diseases. From an anatomic standpoint, there are 2 forms of the infectious variety, in 1 of which there is formation of excrecences, but without any ulceration, and the whole process is well limited; while in the other form there is found the appearance usual in malignant endocarditis. In the rheumatic form he never found microorganisms; but after reviewing the literature he concludes, with Sahli and others, that it is not a specific disease, but one which is the result of various pyogenic microorganisms of a low degree of virulence; and the endocarditis may be due, he believes, to microorganisms directly or to the action of their toxins. This view would, too, explain the production of verrucose endocarditis in tuberculosis, Bright's disease, cancer, and other affections in which bacteriologic examinations are negative. In some of his animal experiments he succeeded in producing infectious endocarditis by injecting bacteria into the veins; but sterilized cultures, when injected, did not produce any valvular lesion. [Further evidence is required to prove the occurrence of endocarditis of noninfectious character. At the present time it seems likely that all cases are microorganismal in nature.]

G. D. Pidcock³ records a case which he calls **chronic malignant endocarditis**. The patient had pneumonia a few months before, and his heart-

¹ N. Y. Med. Jour., Dec. 4, 1897.

² Om endokardit, dens pathol. anat. og aetiol., Kristiania, 1897.

³ Lancet, Sept. 11, 1897.

disease was probably secondary to this. During his stay of one month in the hospital, before his death, he had neither chills, fever, nor embolism, and died of severe gastroenteritis. During life there was a to-and-fro murmur over the pulmonary area, and at the necropsy there was great enlargement of the heart, with an enormous dilatation of the pulmonary artery, while one pulmonary valve was completely destroyed and the others were thickly studded with vegetations. Within the right ventricle there were vegetations and ulcerations.

Etienne¹ has at times found an acute endocarditis associated with tuberculosis; but in most of these cases the endocarditis must be attributed to the sepsis which occurs in the later stages of tuberculosis, since the tubercle-bacillus usually is not found in the vegetations, while other microorganisms frequently are present. Tuberculous endocarditis occurs nevertheless; and in some instances Etienne has found the bacilli in the vegetations. Kerschesteiner,² after a study of endocarditis of the pulmonary valve occurring with pneumonia, states that it may be caused by the pneumococcus, or by the staphylococcus or streptococcus, the course of the disease being in these two instances different. When due to the pneumococcus the course is shorter, the fever continuous, and infarcts and metastatic abscesses are rare, while the contrary is true of infection by the staphylococcus or streptococcus.

General Symptomatology.—R. Quain³ does not believe that either the action of the auriculoventricular valves or muscular contraction of the heart is the **cause of the first sound**. He believes that there is not sufficient tensile force exercised in the closure and apposition of the valves to produce these sounds, and the first sound can also be heard independent of the existence of mitral or tricuspid valves. In the heart of the python the auriculoventricular valves are formed by the continuation of the septum of the auricles, and are merely muscular flaps; sounds are heard nevertheless. Also the healthy first sound may be heard at the base in cases of mitral disease in which it is described as absent. As to muscular contraction causing the sound, Quain has been unable to discover similar sounds when listening over muscles that were contracting strongly. What is heard is a dull rumble; and the hearts of turtles, after removal from the body and when no blood is passing through, still contract, but give no sound. He believes that the first sound is due entirely to the impact of the blood upon the obstruction produced by the columns of blood in the pulmonary artery and aorta—in other words, to resisted motion—thus originating at the base of the heart and being communicated to the apex through the fibroid ring and the muscular walls, which are tense and firm at the moment of systole. He has produced sounds resembling the first sound by passing a current of water through one side of a heart in which the valves had been destroyed, and at the same time compressing the ventricle periodically, in imitation of systolic contraction.

Stengel⁴ discusses the significance of **systolic murmurs** over the apex and base of the heart. After a brief consideration of the production of murmurs in general, he refers to systolic murmurs at the base of the heart. The frequent murmurs heard in this situation in anemia, fever, and other diseased conditions he considers a result of distention of the *conus arteriosus*. This possibly generates abnormal vibrations by the contact of the anterior surface of the distended *conus* and the chest-wall; and the author further admits that Sansom's theory that an irregular tremor is produced in the dilated *conus* itself during systole may be applicable. Of basic cardio-pulmonary murmurs he considers two forms, one intermittent and modifying the respira-

¹ Arch. de Méd. expér., Jan., 1898.

² Münch. med. Woch., Aug. 3, 1897.

³ Dublin Jour. Med. Sci., Aug. 2, 1897.

⁴ Cleveland Jour. of Med., May, 1898.

tions so as to cause "cog-wheel" inspiration, the other regularly systolic and difficult to distinguish from the murmur generated in the distended conus arteriosus. Further, he alludes to basic systolic murmurs in pulmonary stenosis, pericarditis, aneurysm, and mitral regurgitation. Among the systolic murmurs heard at the apex he discusses those occurring in mitral regurgitation, in athletes and others subjected to great strain, in the anemic and febrile, and in occasional cases of aortic stenosis. The apex-murmurs of athletes and the anemic or febrile he believes are really due to mitral regurgitation or to disturbed action of the papillary muscles. Referring the matter of diagnostic significance of murmurs, he distinguishes between "accidental" and "valvular" murmurs, though admitting that the former term must not be taken in too literal a sense. Finally, after a review of the characters of the various murmurs alluded to, he admits that an absolute diagnosis is often impossible, and that murmurs supposed to be due to fixed valvular disease will unaccountably cease.

S. H. Habershon¹ considers that attention to the distribution of the accentuation of the second sound of the heart will aid one in determining the **size of the two ventricles**. This method is not of much value in aortic disease, since the sternum transmits the sound in that case over the area of the right ventricle; but with an accentuated pulmonary sound in mitral disease, the accentuated sound is transmitted most loudly to the ventricle behind this valve—namely, the right ventricle; hence in such cases, if the accentuation of this sound is observed to be sharply limited as one moves the stethoscope from right to left, this line of limitation may be considered the line of the interventricular septum.

William Keiller² contributes an article on the **descriptive anatomy** of the human heart, which is of considerable interest to the clinician. He points out certain inconsistencies in the classical descriptions and, in his own, offers some entirely new names, and illustrates the relations with excellent cuts. We can only allude here to the relations of the heart as he describes them. The apex of the cardiac pyramid is formed by the aorta, pulmonary artery, and superior cava, which spring from the heart on a level with the upper margin of the third costosternal articulation. It extends 1 in. to the right of the middle line and $1\frac{1}{2}$ in. to the left. For the clinician, he states this may be termed the upper limit of the heart. The clinical apex is found in the fifth interspace, $3\frac{1}{4}$ in. from the middle line. The antero-inferior border is indicated by a line convex downward, extending from the clinical apex to a point 1 in. to the right of the middle line at the level of the sixth costosternal junction. This line represents the merging of cardiac and hepatic dulness. The right and left borders of the heart's anterior surfaces are formed by convex lines, which join the right and left extremities of the upper limit of cardiac dulness and the antero-inferior line. Some of the changes in nomenclature which he suggests are to call the interventricular grooves the superior and the inferior. The right coronary artery he terms the anterior, and the left coronary artery the posterior. A study of the cuts accompanying the paper will correct many erroneous notions regarding the exact relations of the heart. His specimens were made from specially prepared subjects and by comparison with illustrations from His's models.

Acute Endocarditis.—F. Billings³ reports an interesting case of **acute vegetative endocarditis with multiple emboli**. The man had rheumatism, which was followed by signs of valvular heart-disease, with frequent

¹ Edinb. Med. Jour., June, 1898.

² Am. Jour. Med. Sci., 1898.

³ Chicago Med. Recorder, Jan., 1898.

crops of multiple emboli in all organs of the body. These emboli were certainly not septic, because there was no suppuration, and chills, fever, and general disturbance were absent. Death was caused finally by cerebral embolism. A. James¹ records a case of **extremely acute ulcerative endocarditis**. The patient died 7 days after the illness began. The symptoms had suggested meningitis and influenza, but there was a cardiac murmur, which led to the thought of malignant endocarditis. Postmortem there were numerous areas of suppuration, which had not been suspected before death, and ulceration of the mitral valves, with some suppuration in the substance of the valves.

Keller² records a case of **ulcerative endocarditis** of the **pulmonary valves**, without any affection of the left side of the heart. The diagnosis of the situation of the disease had been made during life by the presence of a double murmur in the pulmonary area, enlargement of the right heart, and pronounced cyanosis, together with the general symptoms of ulcerative endocarditis. It was thought that the condition was gonorrheal, since the patient had had gonorrheal arthritis shortly before. Postmortem examination, however, showed the presence of streptococci. It is considered possible, nevertheless, that the streptococci may have been given a port of entrance by the occurrence of gonorrheal ulceration of the urethra.

A. Davies³ records the very rare occurrence of **ulcerative endocarditis** in a child suffering from **measles and whooping-cough**. The child died after it had been ill 4 months, and the diagnosis was confirmed by a post-mortem examination.

J. Magill⁴ records a case of erysipelas which originated in the throat and extended through the Eustachian tube to the left ear. While convalescence seemed to appear in about a week, it was followed by a relapse, and this by a second relapse, with septic temperature, pain over the heart, and a systolic murmur, while the area of the cardiac dulness enlarged and the apex-beat became displaced. It was evidently a case of **erysipelatos endocarditis**. The use of antistreptococic serum caused the temperature to become normal almost at once, but the cardiac murmur persisted. Damsky⁵ records a case of erysipelatos endocarditis in a girl of 17, whose erysipelas arose from an injury to the foot. The skin-manifestations disappeared after 4 days' treatment, but the temperature became intermittent and the general condition was very bad. Marmorek's serum was injected, but the patient grew worse. Ten drops of oil of turpentine were then given under the skin of the abdomen, after which the general condition improved at once, and entire recovery ensued. J. N. Hall⁶ records the case of a woman who presented herself with increased cardiac dulness upward and to the right. The valvular sounds were normal, excepting over the pulmonary valve, where there was a loud murmur, most marked at the beginning of systole, changing in timbre at the time of diastole, and continuing through the whole heart-cycle. There was a diastolic thrill in the second interspace. Before a preceding pneumonia, the woman's heart was known to have been normal, and Hall believes that she had had a slight congenital lesion, upon which an acute endocarditis had been engrafted during the pneumonia, causing pulmonary obstruction and regurgitation.

J. W. Washbourn⁷ reports a case of ulcerative endocarditis which recovered under the use of **antistreptococcic serum**. The young woman had

¹ Brit. Med. Jour., Dec. 4, 1897.

³ Med. Press and Circ., May 4, 1898.

⁵ Méd. mod., xiii., No. 54.

² La Tribune méd.

⁴ Lancet, Feb. 19, 1898.

⁶ Med. Rec., Aug., 1897.

⁷ Lancet, Sept. 18, 1897.

irregular fever, chills, and sweats, with some leukocytosis, but without any localizing symptoms for nearly 6 weeks. Then a diastolic murmur developed over the pulmonary valve. 20 c.c. of streptococcic serum were injected daily for the greater part of the ensuing 9 weeks. The temperature fell at once, and continued about normal most of the time, excepting during a short period, when injections were given only on alternate days. By the end of 9 weeks the patient was practically well, and had no return of the symptoms. The murmur, however, persisted. Margaret Pearse¹ reports the case of a girl of 16, who had all the symptoms of ulcerative endocarditis, and was growing continually worse under the use of drugs and all other treatment, until injections of antistreptococcic serum were given. Her general condition then improved, and, although the fever persisted for some time afterward, recovery finally ensued, and appeared to have been due to the serum. Sir R. D. Powell,² in discussing the treatment of heart-disease, tabulates 12 cases of ulcerative endocarditis in which antistreptococcic serum was used. Three recovered, which makes a favorable percentage. One case of Powell's recovered after the use of yeast-cultures. Powell especially insists upon the value of deep inspirations for mechanically relieving congestion of the lungs in chronic heart-disease. He finds that numerous cases are relieved by the Schott method of treatment, but believes this method should not be used with acute endocarditis, severe arteriosclerosis, or in neurotic affections of the heart. R. Pollock³ has used antistreptococcic serum in a case of ulcerative endocarditis. The patient was in a grave state when the serum was used; there was no favorable effect upon her condition, and subsequently she died. Pollock also records an instance of probable ulcerative endocarditis, to which he gave 2 injections of antistreptococcic serum. No improvement was caused and death occurred.

CHRONIC VALVULAR DISEASE.

Symptomatology.—H. Eichhorst⁴ discusses what he terms **toxemic delirium in cardiac diseases**. He has observed this condition in a number of cases of uncompensated valvular disease of the heart when the amount of urine is suddenly made to increase under the use of digitalis. The first symptom is drowsiness, which becomes deeper. The patient's mental condition becomes disturbed and he does not recognize surroundings. He then becomes delirious, the delirium being either mild and quiet, or excited. The pupils are commonly contracted. Inspiration is deeper and the frequency of respiration is increased. The appearance is that of obstruction in the respiratory passages, but physical examination shows that this is not present. The condition usually disappears after several days, when the edema has vanished and the polyuria has ceased. Eichhorst does not believe that it is due to the drugs, and says that all cases have ended in recovery. He does not think that it is uremic, but believes it is probably due to the absorption of a toxic substance present in the dropsical fluid. [It has seemed to us in cases of this sort that disturbances of cerebral circulation played a part in the development of the symptoms.]

J. H. Musser⁵ states that the fact that endocardial **murmurs of organic origin may disappear** has received little attention, excepting in those instances in which the disappearance was due to profound weakness of the heart. The most frequent disease in which the disappearance is noted is mitral obstruc-

¹ Lancet, July 10, 1897.

² Ibid., Apr. 9, 1898.

³ Brit. Med. Jour., Apr. 23, 1898.

⁴ Deutsch. med. Woch., June 23, 1898.

⁵ Brit. Med. Jour., Oct. 16, 1897.

tion. Such a case he reports from his own notes. Postmortem the mitral orifice was enormously dilated and the leaflets greatly contracted; hence the murmur had vanished because the obstruction had disappeared. In a case in which all the signs and symptoms of aortic regurgitation had been present and disappeared, he found after death that the valves were normal, with the exception of enlargement and calcification of the corpora Aurantii. Wearing down of this enlargement had rendered the once incompetent valves again competent. In supposed mitral regurgitation the diagnosis of disappearance of an organic murmur must be made with care, since similar functional murmurs are so frequent.

R. Ballint¹ contributes a study of the **causes of loss of compensation** in cardiac valvular disease. He first reviews the opinions that have been held by authors upon this point, and then refers to experimental work done by himself to determine the matter. He produced artificial lesions of the aortic valves in dogs by direct destruction of one or two leaflets, following the method of Rosenbach. These experiments were performed upon dogs, cats, and rabbits; large rabbits or cats and small dogs being most satisfactory. He observed the animals carefully until their death, and made careful postmortem examinations. In every case there was hypertrophy of the heart. The amount of this apparently depended upon the increase of work. The degree of hypertrophy was estimated by weighing; the average in 19 normal animals per 1000 gm. of body-weight was 9.71 gm.; the smallest weight being 8.54 gm.; the largest, 10.76 gm. In a number of animals with artificial lesions the relative weight was increased very greatly; the smallest being 12.35 gm.; the largest, 16.13 gm. The heart was always larger in cases in which 2 of the leaflets were destroyed than in those in which but 1 was injured. But, notwithstanding severe valvular defects, there was no loss of compensation after long intervals—in one case 293 days. Nor did production of myocarditis or of fatty degeneration cause loss of compensation, for several months at least. When, however, the vagi were cut, compensation was soon lost, more rapidly when both were cut. He decides from his experiments that lesions of the nervous mechanism are of the greatest importance in causing loss of compensation, but the seat of the changes which take place is difficult to determine, owing to the little knowledge we have of the nerve-supply of the heart. [Clinical experience undoubtedly supports the author's conclusions in some particulars. Practical physicians will surely agree that their experience indicates the great importance of nervous disturbances in determining loss of compensation.]

E. M. Skerrit,² in considering the **prognosis of heart-disease**, lays special stress upon the value of eliciting an accurate history, especially as to the length of time the disease has existed, since in this way one can readily judge of the changes that will take place in the individual in a given number of years. He particularly insists that the diagnosis of the nature of the lesion must not be given entire attention, to the exclusion of the consideration of the patient's general condition and his general individuality. As to sudden death, he believes that this occurs in aortic regurgitation only when there is marked dilatation of the left ventricle; and the liability to sudden death is less when mitral regurgitation is added to the aortic disease. Next to aortic regurgitation, he believes that mitral regurgitation most frequently ends in sudden death, seemingly omitting mention of this occurrence in mitral stenosis. In cardiac degenerations sudden death is to be feared when there is at the same time increased arterial tension.

¹ Deutsch. med. Woch., Jan. 6 and 13, 1898.

² Boston M. and S. Jour., Nov. 6, 1897; Lancet, Nov. 6, 1897.

J. E. Grahan¹ draws attention to evidences of cerebral anemia and the condition of the pulse as important points in diagnosing the severity of aortic stenosis. In severe aortic insufficiency the absence of collapsing pulse is an unfavorable sign. Hereditary tendency to arterial or cardiac disease makes the prognosis worse in existing heart-disease, as does a late origin of the disease. Sudden death in the midst of health occurs in aortic regurgitation only. When sudden death occurs in mitral stenosis it is preceded by serious symptoms. Paroxysmal bradycardia in elderly people is of unfavorable prognosis, and paroxysmal tachycardia is likewise apt to terminate fatally, though arrhythmia is of worse prognosis.

Mitral Stenosis.—Samways² has analyzed the postmortem reports of all cases at Guy's Hospital during 10 years (1886 to 1895) in which stenosis of the mitral orifice was found. Among 4791 necropsies there were 196 cases (about 4%) of evident mitral narrowing. He considered any orifice below $3\frac{1}{2}$ in. (2 fingers) in circumference as narrow, and any one over this figure as doubtful or normal. The orifice exceeded $2\frac{1}{4}$ in. (1 finger) in circumference in 108 cases, and measured $2\frac{1}{2}$ in. or less in 85 cases. The average age at the time of death was $38\frac{1}{2}$ years for males, and about the same for females. In severe cases the average was less than this, and in milder cases greater. In 32 cases there was coincident tricuspid stenosis; 21 of these cases were women and 11 men, and almost all of the cases were severe forms of mitral disease. In a large proportion of the cases the aortic leaflets were thickened or distorted, but were seldom stenotic. Of 77 severe cases the left auricle was spoken of as greatly hypertrophied in 22, as hypertrophied in 17, and as slightly hypertrophied in 5; while among 96 less severe cases there was considerable hypertrophy in 14, hypertrophy in 2, and slight hypertrophy in 5. The left auricle in 77 severe cases was much dilated in 14, dilated in 18, and slightly dilated in 7; while of 96 less severe cases it was much dilated in 8, dilated in 15, and slightly dilated in 6. The left ventricle was generally normal or small, rarely enlarged by either hypertrophy or dilatation. From the rarity of dilatation of the left auricle in cases coming from the surgical wards, in which death had not been due to the cardiac trouble, he concludes that the dilatation probably appears late in the disease. A history of rheumatism was obtained in over 60% of all the cases. [These statistics have a certain value from the care the author has taken to make them accurate; but, as in all such statistical tables, personal impressions and opinions govern the exact color of the figures.]

Cochez³ has observed **congenital, familial, and hereditary mitral stenosis** in 2 families. In the first family both the mother and a child 6 years of age had pure mitral stenosis. In the second instance, the mother and 4 children, aged 20, 14, 12, and 3 years, showed the same lesion. He insists that the familial and hereditary origin of mitral stenosis should receive more attention from pathologists, and he believes that the disease is probably often congenital. In support of the latter theory he mentions the cases of 2 men who had mitral stenosis in association with other deformities, and in which the mitral stenosis had no discoverable cause. A. E. Sansom⁴ considers mitral stenosis a distinctly rheumatic affection and not due to congenital deformity, though he thinks it is sometimes antenatal in origin. It is more apt to be associated with the slow, insidious form of rheumatism than with the outspoken forms. It is commonest at 14 or 15 years of age, and, of course, more frequent in females than males. Sansom believes that a relationship does exist between this lesion and tuberculosis, but only because the

¹ Canad. Pract., Feb., 1898.

³ Quatrième Congrès Franç. de Méd. int., 1898.

² Brit. Med. Jour., Feb. 5, 1898.

⁴ Brit. Med. Jour., June 25, 1898.

cardiac disease lessens the patient's resistance to the tubercle-bacillus, particularly in patients who are very anemic or ill-developed. The prognosis in this affection is decidedly bad, and life is usually not prolonged beyond 40 years. D. W. Samways¹ believes that a systolic murmur is frequently absent with coexisting stenosis and insufficiency of the mitral valve, because there is prolongation of the auricular contraction owing to the obstruction, and this prevents backflow from the ventricle. He states that he is convinced that in time surgery will advance to such a stage that grave cases of mitral stenosis will be turned over to surgeons to have the contracted mitral orifice partly divided by the knife, in order to widen the opening, at the expense of producing a regurgitation which is less dangerous than a severe stenosis. [This will certainly be radical surgery.]

A. B. Preble² directs attention to the fact that there may be inequality of the radial pulses in other conditions than aneurysm, and especially has he noted it in mitral stenosis, the left pulse in many cases being distinctly smaller than the right. This symptom usually appears only when the heart has become incompetent, and he explains it by his belief that the dilated left auricle and pulmonary artery press backward upon the left subclavian artery. The pulmonary veins also aid in this pressure. When cardiac dilatation becomes so great that there is tricuspid insufficiency the inequality of the pulse disappears, or the left becomes larger than the right. This is due to the fact that the left auricle and pulmonary vessels are less distended and exert less pressure; while the right auricle and the venæ cavae become overfilled and press upon the right subclavian artery. [This inequality of pulses in mitral and tricuspid disease was noted by Popoff several years since.] Ortnier³ records 2 cases of mitral stenosis in which **paralysis** of the **recurrent laryngeal** nerve led to great difficulty in diagnosis. In both cases this was found at postmortem to be due to compression from enormous distention of the left auricle.

Aortic Stenosis.—T. N. Kelynack⁴ records 2 cases of aortic stenosis which died suddenly, thus to some extent controverting the general opinion that sudden death rarely or never occurs with this lesion. Kelynack, however, notes the rarity with which this lesion is found uncomplicated. He gives reports of 5 cases which he found in 1635 autopsies which he performed.

Aortic Regurgitation.—Weismayer⁵ discusses the difficulty in diagnosing aortic insufficiency from pseudoin sufficiency, especially when there is actual disease but no murmur. Functional murmurs in this situation are extremely rare, but a lesion without murmur occurs fairly commonly. The explanations that have been advanced for this do not clear up those cases with high pressure in the blood-vessels. In such cases the author believes the shape of the opening may cause the return-flow of blood to meet that from the auricle at such an angle that the murmur is not produced. He records 2 cases of pseudoin sufficiency. They had exhibited the typical peripheral symptoms of aortic regurgitation, but the valves were found at the postmortem to be normal. He would explain this peripheral pulsation by accepting the existence of hypertrophy and dilatation of the heart with atheroma of the aorta, which would prevent the latter from dilating and, therefore, cause sudden overfilling of the peripheral vessels. A. Borgherini⁶ draws attention to the fact that in aortic regurgitation the opening through which the blood passes back into the heart is not a small fissure, but there is usually formed somewhat of a canal, directing the blood toward some definite portion of the heart. It is to this

¹ Lancet, Apr. 2, 1898.

² Wien. klin. Woch., No. 33, 1897.

³ Zeit. f. klin. Med., vol. xxxii., supplement.

⁴ Chicago Med. Recorder, Oct., 1897.

⁵ Med. Press and Circ., May 11, 1898.

⁶ Deutsch. Arch. f. klin. Med., Apr. 7, 1898.

that he would attribute the variable position of the murmur and the variable size of the heart, and, to a considerable extent, the variable course which these cases may run. If, for instance, the stream be directed toward the interventricular septum, it will dilate the left ventricle toward the right as well as downward. It will thus interfere with the action of the right ventricle and will cause early heart-failure. In such cases, too, the murmur will be heard in a somewhat limited area toward the base of the sternum. In other cases the chief strain falls upon the main portion of the left ventricle, or, perhaps, upon the mitral valves, resulting in the last case in signs of disease of these valves as well as of aortic regurgitation.

Tricuspid Stenosis.—C. Kasem-Beck¹ records 2 cases of tricuspid stenosis combined with mitral and aortic disease. In the first case there was a loud first sound with a muffled second sound, followed by a diastolic murmur, and a faint systolic murmur in the middle of the sternum. The diagnosis of the valvular lesion was double aortic disease and insufficiency of the tricuspid from dilatation. At the autopsy double aortic disease, tricuspid stenosis, and relative insufficiency of the mitral valve were found. In the second case there was a systolic and diastolic murmur, most marked in the aortic region, with enlargement of the heart. The diagnosis had been double mitral and double aortic valvular disease, with dilatation of the aorta and relative insufficiency of the tricuspid. The mitral and aortic disease was found, but there was also stenosis of the tricuspid.

CONGENITAL LESIONS OF THE HEART.

V. Eisenmenger² has made sections from a heart in which the **aorta arose from both ventricles** and there was a deficiency in the interventricular septum, and decides from his sections that the deformity may be due to a defect of the posterior part of the septum resulting from any cause, either obstruction in the pulmonary artery, congenital deviation of the septum, or other deformities.

W. Zinn³ describes a case which he diagnosed as **persistence of the ductus arteriosus**, without any other deformity of the heart. The woman, 37 years of age, had been dyspneic from childhood. The cardiac dulness was very much enlarged, especially on the right; there was an area of dulness in the upper intercostal space to the left of the sternum, and a thrill and a loud systolic murmur could be detected here. The second pulmonary sound was not accentuated, which fact Gerhardt explains by believing that the ductus arteriosus was very wide, and caused such a constant and profuse flow of blood into the pulmonary artery that it did not contract sufficiently during diastole to cause a loud valvular tone. The signs mentioned, the absence of cyanosis, and the fact that the murmur was conducted into the neck, led to the diagnosis, and this was somewhat supported by finding a shadow under the left-hand portion of the sternum upon taking a radiograph.

W. Gordon⁴ records an instance of **perforate septum ventriculorum, with infective endocarditis** of the pulmonary valves. The patient was a boy, 5 years of age, who had a harsh systolic murmur, loudest at the junction of the third and fourth left costal cartilages with the sternum. There was also a strong systolic thrill. He had irregular fever, signs of constantly failing heart, and repeated pulmonary embolism. Postmortem the ventricular septum was perforate, and there were large vegetations on the pulmonary valves

¹ *Centralbl. f. innere Med.*, Nov. 13, 1897.

² *Wien. klin. Woch.*, Jan. 13, 1898.

³ *Berlin. klin. Woch.*, May 16, 1898.

⁴ *Brit. Med. Jour.*, Oct. 24, 1897.

and on the neighboring walls of the right ventricle. Gordon considers the rapid enlargement of the heart which took place in his case an important point, since the diagnosis was difficult, owing to the suspicion of a congenital cardiac lesion, and the rapid enlargement was the strongest sign he discovered of acute inflammation of the heart. Since the disease did not extend from the right side of the heart to the left, and there were no emboli in the systemic circulation, it seems probable that there is no current from right to left in cases of perforate septum.

J. M. Patton¹ records a case in which there was a systolic thrill in the second left intercostal space, with a rough systolic murmur at the base and over the sternum as low as the sixth costal cartilage. There was moderate enlargement of the heart. Postmortem there was **congenital stenosis of the pulmonary, patent foramen ovale, and deficient septum ventriculorum.**

Auché and Bouyer² have discovered a case of **dextrocardia**, without any change in position of the other viscera, and which was apparently congenital in origin. The case was not verified by postmortem examination, however.

Diseases of the Myocardium.—Herringham³ records a case of sudden death in the course of acute rheumatism. Postmortem there was found an acute degeneration of the myocardium, which is rare in connection with acute rheumatism.

Pasquier⁴ offers proof that **fibroid myocarditis**, which is often believed to be due to anemia of the heart, is the result of chronic congestion. He notes that stopping the vessels supplying the organ does not cause diminution in the bulk of the organ, but results in enlargement by congestion, and reminds us that embolic plugging of the coronary vessels is often followed by actual hemorrhage into the heart-substance. He also states that loss of resiliency in the aorta, particularly when occurring in connection with aortic insufficiency and narrowing of the coronary vessels, results in lessening the force necessary for propelling blood through the coronary circulation. From this a capillary stasis ensues, and later sclerotic changes occur in the tissue. As a consequence of such reasoning, he believes that digitalis is not useful in these conditions, and that bleeding should be used instead.

Kronecker⁵ has investigated the effect of **occlusion of the coronary arteries** by injecting paraffin. The heart became irregular even when the paraffin solidified in only the smaller branches, and stopped almost at once. Injection of milk or of ethyl-chlorid spray caused the heart to become irregular and also to stop beating, but warm blood did not stop the heart, so that death seemed to be due to the anemia rather than to the mechanical insult. From his experiments, Kronecker has also reached the conclusion that the heart-muscle cannot be directly excited by electricity, but only by reflex action.

Mendelsohn⁶ exhibited a patient who, 8 months before, had fallen from a horse, and subsequently had pain in the region of the heart, dyspnea, and attacks of syncope. Dilatation of the heart and arrhythmic pulse appeared. The diagnosis of **traumatic myocarditis** was made, and seemed to be established, since the patient was known to have had a healthy heart before the injury.

A. Hasenfeld⁷ has studied the question of the extent to which **arterio-**

¹ Clinical Rev., Feb., 1898.

² Jour. de Méd. de Bordeaux, Aug. 22, 1897.

³ Gaz. hebdom. de Méd. et de Chir., Feb. 10, 1898.

⁴ Rev. de Méd., Nov., 1897.

⁵ Congress of Internal Medicine, Berlin, 1897.

⁶ Berlin. klin. Woch., Feb. 7, 1898.

⁷ Deutsch. Arch. f. klin. Med., Dec. 9, 1897.

sclerosis alone will cause **hypertrophy** of the heart. The heart hypertrophies only when the arteries of the viscera are markedly sclerotic, or when there is sclerosis of the thoracic aorta. If the kidney is contracted, but there is no arteriosclerosis, the heart becomes hypertrophied; but if sclerosis is added to contracted kidney, the left ventricle becomes excessively enlarged. If the peripheral arterioles are affected in arteriosclerosis, the heart does not suffer greatly. The author finally decides that the hypertrophy which occurs in contracted kidney is probably due to the action of an irritant, which either directly influences the heart or increases its work.

A. B. Preble,¹ in considering the **effects of arteriosclerosis** upon the heart, classifies as symptoms to be attributed to this cause: angina pectoris, cardiac asthma, irregularities in the pulse, and evidences of cardiac incompetency, which come on suddenly without any previous indication of heart-trouble. There may be signs of valvular lesions, but these are, of course, not necessary.

Vaquez and Millet² discuss the **effect of pregnancy** on the heart. They believe that any hypertrophy during this period is due to some associated condition, such as Bright's disease, and have been unable to discover a case of hypertrophy due purely to pregnancy. There is some increase in intrapulmonary vascular tension, as shown by the accentuation of the pulmonary second sound and the reduplication of the second sound at the base, and by occasional hemoptysis, so that it seems that any overstrain would readily cause dilatation of the right ventricle; but when this occurs it is an actual pathologic condition, and is not normal to pregnancy. With the increased pulmonary congestion the heart itself becomes engorged, and there occur small myocardial apoplexies, of which the authors describe examples. They occur most frequently in the left auricle, and especially with mitral stenosis.

C. Levi-Sirugue³ has studied the **effects of the bicycle** from a medical point of view. He noted that it increases muscular power. The uric acid is apt to be diminished, though urea is largely increased, and there is usually azoturia. The digestion is apt to be interfered with by the compression of the digestive organs in the bad position assumed, and the excessive sweating may decrease the amount of gastric juice. The respiratory and circulatory organs are, however, put on the greatest strain, since the bicycle greatly increases their work. The evil effects produced are particularly seen in the heart. There may be irregularity of the pulse, false angina, acute dilatation, hypertrophy, and various other conditions. Albuminuria is frequent after the use of the bicycle, and there is sometimes hepatic congestion, and disturbances of the genital organs may be seen. The main contraindications are those on the side of the heart. The bicycle should be absolutely proscribed in arteriosclerosis and in the cardiopathies of childhood. In severe disease of the lungs it should be interdicted, though in some milder forms it may have good effects. In women, gonorrhea or gonorrheal endometritis, tumors, and pregnancy should contraindicate it; while in men, acute or chronic urethritis and hypertrophy of the prostate are contraindications, but it may do a great deal of good in gouty cases, in some gastrointestinal affections, particularly of functional character, and in many nervous affections, such as paresis and hysteria. In neurasthenia it should be used if the affection is of mild degree, but in the severer forms it may be very harmful. [Authors should distinguish more carefully between moderate and excessive bicycling.] Bourey⁴ has made an investigation by special apparatus of the effect of bicycle-riding upon the pulse, and finds that the num-

¹ Medicine, July, 1897.

² Presse méd., Feb. 2, 1898.

³ Gaz. des Hôp.

⁴ Proc. Internat. Med. Congress, Moscow, 1897.

ber of pulsations is increased in proportion to the increase of work. The pulse was found to be of low pressure. If the work were not too severe the heart accommodated itself to it, so that it seems advisable to have bicyclists watch their pulses in order to determine the amount of riding that is safe for them.

L. Feilchenfeld¹ insists upon the necessity for determining the existence of the less severe grades of **relaxation of the heart-walls**, which he claims to be able to do better by palpation than by percussion. He states his absolute belief that cases of so-called nervous palpitation and weak heart, irritable heart, and the like, are usually cases of relaxation of the heart-walls, and insists that they be recognized early and treated with heart-tonics, rest, and hygienic measures, or they will cause irreparable damage.

J. Tyson² suggests the use of the term **cardiac distention** for cases in which there is enlargement of the heart-cavities without degeneration of the walls. The enlargement is purposeful and compensatory; the term dilatation should be restricted to those conditions in which there is stretching of the cavities owing to degeneration of the walls of the heart. Those cases with simple hyperplastic muscle and correspondingly enlarged cavity he would call hypertrophy with expansion. N. S. Davis, Jr., in discussing the paper, said that he constantly uses the terms cardiac fatigue and cardiac exhaustion to represent the two extremes of cardiac weakness; the first is temporary and often curable; the latter is permanent and not curable.

H. Jackson³ notes, as a sign of cardiac failure, a discrepancy between the rate of the arterial pulse and the rate of the heart-beats, of a different character from those instances in which it is extremely difficult to count the pulse; his cases not showing a rapid pulse when carefully and exactly counted, while examination of the heart demonstrates that its action is extremely rapid. The cases from which his notes were made were instances of dilatation of the heart from disease of the myocardium. It may also occur in acute infectious diseases. As examples, cases may be noted in which the apex-beat was 140 and the pulse 70, and another in which the apex-beat was 170 and the pulse 50.

Huchard⁴ insists upon the importance of what he calls **bradydiastole**, which is a phenomenon the distinct opposite of that heard in embryocardia—*i. e.*, a prolongation of the pause during diastole. The number of pulse-beats may be quite normal, but upon auscultation there will be heard the two sounds of the heart coming very closely together, the diastole being prolonged at the expense of the two sounds. Huchard considers this of extreme importance. He has often observed it when death was near, and he thinks it a valuable premonitory symptom of approaching dissolution, more especially when death is preceded by great dilatation of the heart. The early discovery of this should, he says, be the signal for phlebotomy and the use of cardiac stimulation.

Tuberculosis.—E. Kaufmann⁵ records a case of tuberculosis of the heart-muscle. During life there was increase in the extent of the cardiac dullness, the heart-action remaining regular, with weak but pure sounds. Arrhythmia appeared subsequently, and the patient died with Cheyne-Stokes breathing. Postmortem the right auricle was protruded forward by a tumor-like mass, which projected chiefly into the interior of the auricle in the form of four large masses, with several smaller ones surrounding these, the whole nearly filling up the cavity. Upon incision, the tumors were of variable consistency, in parts glassy and homogeneous, and in other parts cheesy. Microscopically

¹ Berlin. klin. Woch., Feb. 28, 1898.

² Brit. Med. Jour., Oct. 30, 1897.

³ Boston M. and S. Jour., Nov. 4, 1897.

⁴ Jour. des Prat., Oct. 30, 1897.

⁵ Berlin. klin. Woch., Aug. 2, 1897.

they had all the appearance of tuberculosis arising in the heart-muscle. Tubercle-bacilli were present.

Syphilis.—E. R. Le Count¹ reports a case of **syphilitic disease of the heart in the new-born**. A child born at term, of young parents, died almost immediately after birth. Among the lesions found were firm white nodules in the lungs, some of these as large as cherries, and over the left lower lobe there was fibrinous pleurisy. The liver was enlarged, as was also the spleen. The thymus gland contained several small softened areas, containing gray, viscid pus. The lines of ossification in both the long and the flat bones were irregular, wider than normal, and hemorrhagic. In the heart there was an area of white color, about 1 cm. in diameter, in the anterior wall; this merged gradually with the adjacent tissues and extended inward to the columnæ carneæ. On the posterior wall of the heart were several smaller areas. Microscopically these foci showed infiltrating round cells, mainly around the blood-vessels, and a tendency to fibrous organization. There were areas of softening, with degeneration of the heart-muscle fibers, and many leukocytes. The case was apparently one of syphilitic myocarditis, rather than gumma.

Aneurysm of the Heart.—J. J. Burgess² records the case of a woman, 80 years of age, who died suddenly, and in whose left ventricle there was found an unruptured aneurysm. The posterior coronary artery was enormously thickened and its lumen blocked.

Rupture of the Heart.—D. Hunter³ describes a case of **incomplete rupture of the right ventricle**, in which there was absence of marked cardiac pain. The pericardium was adherent, and there had been for 10 years evidence of feeble cardiac action. The patient, a demented woman, was very fat, and at autopsy the heart-muscle itself was found fatty. J. B. Gibbons⁴ found that a patient who had been struck with a bamboo-stick and immediately went into collapse, had a rupture of the heart from this slight blow. The explanation which he offers is that the right ventricle had ruptured near the apex. This ventricle, near the apex, is very thin, and as the stomach was extremely distended and had pushed this portion of the ventricle forward, it received the force of the blow. Duplant⁵ observed a man of 68 years, who had previously had pain over his heart and symptoms of heart-failure. The pains increased, he became dyspneic to a high degree, there was diffuse pulsation over the precordia, the dullness became greatly increased, and the pulse impalpable. Death occurred, and the autopsy showed the pericardium filled with clot, from a rupture of the left ventricle resulting from a large **infarct**. A clot had nearly occluded the rent, and this explained the slowness of his death. G. Silverthorn⁶ reports a case of rupture of the left ventricle, about 1 in. in length, which occurred in a man of 60, directly after straining at stool. The left ventricular wall was very thin, friable, and fatty; the left coronary artery was extremely atheromatous, and there had been an anemic infarct, through which the rupture had taken place.

Cardiac Tumors.—A. Lambert⁷ reports a case of **sarcoma** of the heart in a man of 39, who had been kicked by a horse and suffered from fracture of several ribs in the pericardial region. This happened years before, and had caused no symptoms until shortly before he was first seen. There were then signs of pneumonia and pleurisy, and also symptoms of pericarditis. He had a slow pulse, marked dyspnea, and huskiness of the voice, with cyanosis

¹ Jour. Am. Med. Assoc., Jan. 22, 1898.

² Dublin Jour. Med. Sci., Feb., 1898.

³ Lancet, Dec. 18, 1897.

⁴ Indian Med. Gaz., Dec., 1898.

⁵ Gaz. hebdom. de Méd. et de Chir., Apr. 14, 1898.

⁶ Canad. Pract., Apr., 1898.

⁷ N. Y. Med. Jour., Feb. 12, 1898.

of the upper parts of the body. The patient died 2 months later, and within the distended pericardium there were white nodules and a growth involving almost the entire wall of the left ventricle. The aorta and vena cava, as well as the vagi, were compressed. A secondary nodule of similar sarcomatous tissue was found in the head of the pancreas.

H. Guth¹ presents a description of a case of **myxoma** of the tricuspid valve. Although cardiac growths are rare, it is notable that this tumor has been described 18 times. This case was a myxopapilloma. There was also medullary carcinoma of the stomach, but the tumor of the heart was absolutely not metastatic. It was about the size of a bean, and was on the auricular surface of the valve. Its microscopic appearance was that of fibers surrounded by a homogeneous substance, which stained red with Van Gieson's method. The surface was villous.

R. Crawford² describes a remarkable tumor of the **pulmonary valves**. It grew from the posterior cusp and the neighboring parts of the artery and the walls of the ventricle, and was 5 cm. in length and 3 cm. in transverse measurement. It caused no dilatation of the pulmonary artery, but blocked the channel almost completely. There had been no clinical symptoms in the patient, who was 72 years old, until the time of his death, which occurred with the utmost suddenness. The microscopic examination of the tumor showed that it was a cardiac **thrombus** of slow formation, without any discoverable initial nucleus. There was no endocarditis, and no history of preceding infectious disease.

Jamieson³ notes the case of a boy, 9 years of age, who had been in perfect health, but suddenly became livid and breathless, and died. Upon postmortem he found that a **hydatid cyst** the size of an orange had ruptured into the right auricle. Both right cavities of the heart were filled with daughter-cysts, and one of these completely blocked the right pulmonary artery. There were a number of other cysts beneath the epicardium. A sister of the child had been operated upon several years before for hydatid of the liver.

Treatment of Cardiac Disease.—T. Schott,⁴ after a preliminary description of the methods of treatment of cardiac affections in use at Nauheim, presents the records of 3 cases, of which he had radiograms taken before and after the treatment, and which showed apparent marked decrease in the size of the heart. Radioscopy may also be used to aid in determining whether cases are suited to the treatment, as they show no decrease in size of the shadow, or even an increase after treatment, if they are unsuited to the method. Also, radioscopy seems to Schott to have confirmed his previous statement, based upon older methods of physical diagnosis, that the heart does decrease greatly in size after the baths.

J. M. Patton⁵ has observed after **Schott-baths** in heart-diseases that there is an increase of from 1 to 1½ in. in chest-expansion, and a diminution of ¼ to ½ in. in the transverse diameter of the cardiac dulness. This he has seen even in cases which were not favorably affected by the baths, and in which increase in the power of the heart-muscles was extremely transient. C. N. B. Camac⁶ reports the results of the treatment of 10 cases by the Schott method. As a result of the observation of these cases, he has concluded that extensive nephritis is a serious obstacle to good results, but such cases may be controlled by the treatment, if the disease is not too grave. Arteriosclerosis does not wholly contraindicate the treatment. Extensive changes in the position

¹ Prag. med. Woch., Feb. 24, 1898.

² Austral. Med. Gaz.

³ Clin. Rev., Apr., 1898.

⁴ Tr. Path. Soc. of London, Mar. 5, 1898.

⁵ Wien. med. Woch., May 21 and 28, 1898.

⁶ Jour. Am. Med. Assoc., Aug. 28, 1897.

of the apex-beat and cardiac outline do not indicate permanent good results. The effect of the Schott baths was very much more marked than was the effect of simple hot baths. Four of the 10 cases were fatal; 1 of these fatal cases was a very advanced case of nephritis, and entirely unsuited to the treatment, but the treatment was used to see its effect. In discussion, Osler said that the value of the treatment is more particularly limited to those cases with dilatation of the heart without much muscular degeneration, especially such as occur in youthful subjects. C. G. Stockton said that he used an ordinary soda-water tank in order to cause effervescence of the bath. J. Tyson¹ has found the Schott treatment useful in reducing the frequency of the pulse and in regulating cardiac action. The dropsy diminishes and the cardiac area becomes reduced, though the latter sign of improvement was much less definite than in the results of some other investigators. To the conditions in which this treatment is usually recommended Tyson adds cases of Bright's disease with dropsy, and especially commends massage as a useful adjuvant. W. Hutchinson² goes into a proof, by comparative physiologic studies, of the existence of active contractile movements in the walls of the veins, lymphatics, and capillaries, as well as in those vessels which have muscular walls. He believes that the beneficial effects of baths in circulatory diseases are due to stimulation of the skin-circulation, in which the blood is actually propelled by the force of the resulting contractions.

K. Stewart³ believes that a certain law of hydrostatics, which is of importance in the Schott treatment of heart-disease, has been overlooked; that is, that the pressure upon the immersed portions of a body that is floating on the surface of a liquid is equal to the weight of the body. Hence in the baths the pressure upon the skin of the patient and the immediately subjacent structures is equal to the weight of the patient. This causes increased resistance to the circulation at the periphery and propels the venous blood and the lymph toward the internal cavities, while the diaphragm is pushed upward from the pressure upon the abdomen, thus displacing the heart upward and decreasing the expansion of the lungs. Some reflex action from the cutaneous nerves is probably also caused.

A. E. Sanson⁴ warns against the too hasty conclusion that temporary improvement in cardiac disease has been directly due to baths, exercise, or other treatment. The methods are undoubtedly useful, but praise of them has sometimes been immoderate.

Colombo⁵ strongly recommends the more general use of **kinetic treatment** of heart-disease, even in advanced cases. The Swedish method can be well used in cases that are unable to leave their beds.

Barić⁶ advises the more extensive use of **Swedish movements** in heart-disease, to decrease the peripheral resistance and increase the contractile power of the heart. The three main points of treatment are the local kneading, rubbing, and stroking; the movements of circumduction which increase circulation in the venous trunks; and those movements which favor respiration. The treatment should be carried out for at least 1 hour daily, and during 3 months of each year. He finds it especially valuable in dilatation, hypertrophy, fatty degeneration, chronic myocarditis, and functional heart-affections.

P. Cantru⁷ recommends **abdominal massage** in diseases of the heart,

¹ Univ. Med. Mag., July, 1897.

³ Brit. Med. Jour., May 24, 1898.

⁵ Gaz. med. di Torino, Nos. 39 and 40, 1897.

² Boston M. and S. Jour., Nov. 18, 1897.

⁴ Lancet, Mar. 26, 1898.

⁶ Sem. méd., Nov. 12, 1897.

⁷ Bull. de l'Acad. de Méd., May 10, 1898.

since he finds that after its use the edema decreases rapidly, the general condition improves, and the urine becomes normal.

H. A. Hare and W. M. L. Coplin¹ have investigated the **effects of digitalis** upon the nutrition of the heart-muscle, by selecting a litter of 10 pigs of approximately the same weight, all receiving the same food, but 5 being given digitalis. The latter grew more rapidly. All were killed after 4½ months. The total weight of the 5 given digitalis was 20 pounds greater than the total weight of the other 5, while the total weight of their hearts was 3¼ oz. greater. A study of the size of the heart-muscle showed that those pigs getting digitalis had, on the average, longer fibers than those that did not receive it.

Vierordt² has customarily administered large doses of **sodium iodid** in cases of circulatory disease, particularly when arteriosclerosis was also present, and has found it very valuable, especially in cases of angina pectoris. In about half of such cases he has been able to obtain protracted improvement by this treatment.

I. M. Levechov³ has had good results from the use of **periplocin**—the active principle of *Periplocia græca*—when administered subcutaneously in diseases of the circulatory organs. He injects $\frac{1}{13.6}$ to $\frac{1}{6.5}$ gr. The injections are very painful, and the pain persists for some time; but he found that the drug slowed the pulse and increased the strength and contractile power of the heart.

A. McPhedran⁴ insists upon the value of **morphin** in heart-disease. He is inclined to consider it of even more importance than digitalis in severe cases accompanied by a good deal of cardiac excitement and dyspnea, and has found that many cases yield to morphin when they have resisted cardiac tonics. Exhaustion of the nerve-centers seems to be the condition which indicates morphin. [We can confirm the author's statements to the extent that we have found morphin invaluable in certain cases of aortic valve disease.]

E. Baronaki⁵ treats the asystole of aged patients by first putting them upon milk-diet, with ½ dram of tincture of digitalis daily for 4 days, and then administering 7½ gr. of theobromin every 2 hours, giving in all 44 gr. in the day. As soon as free diuresis is produced, and the edema and uremic symptoms disappear, the drug should be stopped, lest it upset the stomach.

C. R. Marshall⁶ notes that in the treatment of heart-failure due to arteriosclerosis the stages of the disease must be distinctly separated; in the early stage, with increased arterial blood-pressure, iodids, with an occasional mercurial or saline purge, afford the best treatment. When the arterial tension is failing digitalis and, sometimes, the vasodilators are indicated.

CARDIAC NEUROSES.

A. E. Sansom⁷ discusses the relations between disturbances of the rhythm of the heart, neuropathic dyspepsia, and influenza, and reaches the conclusions, from his observation of cases, that essential tachycardia is not usually accompanied by dyspepsia, while the paroxysmal form and those forms that show slight or severe evidences of Graves's disease are often associated with dyspeptic crises. Arrhythmia may occur without manifestations of dyspepsia, and usually does so occur unless predisposing causes to arrhythmia exist in dyspeptic patients. Arrhythmia often replaces tachycardia in Graves's disease,

¹ Therap. Gaz., Dec., 1897.

³ Sem. méd., vol. 18, No. 23, p. 71.

⁶ Bull. gén. de Thérap., liv. 8, p. 330, 1897.

² Congress of Internal Medicine, Berlin, 1897.

⁴ Canad. Pract., May, 1898.

⁵ Brit. Med. Jour., Dec. 11, 1898.

⁷ Lancet, Aug. 28, 1897.

and then paroxysmal dyspepsia is frequent. Bradycardia may exist without signs of dyspepsia, though the paroxysmal or persistent cases are often associated with dyspepsia. There is no well-defined relation between dyspepsia and the structural diseases of the heart sometimes seen in cases of disturbed heart-rhythm, and it is probable that all forms of disturbed heart-rhythm, and the digestive disturbances occurring with them, are due to affections of the nerves. All these cases are especially common after influenza, and are probably frequently due to that disease.

Sir R. D. Powell,¹ in considering the treatment of cardiac disease, expresses the belief that functional disorders have increased of late in consequence of the freedom with which coal-tar preparations are used by the public. In discussing **bradycardia**, he refers to a remarkable case of exophthalmic goiter. In this case, under treatment the goiter gradually disappeared, until there was almost complete atrophy of the thyroid gland. Myxedema did not develop, but the heart-beats became progressively slower, sinking from 136 to 30 in the minute. R. T. Bruce² records the case of a man of 75, who had an astonishing bradycardia. He was somewhat giddy and had attacks of faintness. His pulse was found to be 34 to the minute, and subsequently dropped as low as 20 to the minute. During this time he had peculiar slight convulsions in the muscles of the face, which later became general, and were accompanied by some loss of consciousness. These persisted during the last 2 weeks of life. Repetition of a peculiar cycle of phenomena came on two days before death. He became ashy-gray in color, seemed to be dying, and was comatose, and neither respiration, pulse, nor heart-sounds could be determined. This would persist for about 40 seconds; then, with the return of the pulse and breathing, the convulsions would return, this persisting for about 30 seconds, when the cycle would begin again. This condition persisted for about 48 hours, and was followed by death. [There was no autopsy. The possibility of a focal lesion in the brain is certainly interesting.] C. J. Whalen³ records a case of fatty heart with bradycardia occurring in a man of 54. The patient used malt-liquors and stronger alcoholic drinks freely. He came under observation suffering from dyspnea, palpitation of the heart, and swelling of the feet and legs. The pulse was regular, but the rate was only 32 to the minute. The patient grew worse and died, and at the autopsy the organ was found dilated and extremely fatty. The coronary arteries were soft. J. M. Rattray⁴ gives the notes of the case of a woman, 70 years of age, who was of gouty diathesis, and had severe attacks of pain somewhat resembling renal calculus. During these attacks her pulse ranged about 40 per minute, until toward the latter part of her illness, when it suddenly rose to 128, but soon dropped again as low as 26. Death occurred very suddenly. E. Moritz⁵ records an instance of bradycardia **of one ventricle**. His observations were made upon the pulsations in the veins in the neck, and he believes that the right heart contracted 2 or 3 times while the left heart was contracting once. The case was probably one of syphilitic myocarditis.

T. J. Yarrow⁶ records a case of **tachycardia** in a patient convalescent from typhoid fever. The pulse at times reached 210 to the minute, and was for a number of days above 150, but entire recovery was brought about by the use of digitalis.

T. A. Claytor⁷ considers that the neurotic form of arrhythmic pulse is of

¹ Lancet, Mar. 26, 1898.

³ Jour. Am. Med. Assoc., Apr. 23, 1898.

⁶ Proc. Internat. Med. Congress, Moscow, 1897.

² Scottish M. and S. Jour., Apr., 1898.

⁴ Brit. Med. Jour., Oct. 30, 1897.

⁵ N. Y. Med. Jour., Dec. 25, 1897.

⁷ Univ. Med. Mag., Jan., 1898.

favorable prognosis as long as the patient is unaware of the existence of the **arhythmia**. If he learns of its existence, his anxiety because of it will usually increase the trouble. Other forms of arhythmia are of importance according to their persistence and their increase after exertion. A rhythmic arhythmia is of graver prognosis than irregular arhythmia.

Angina Pectoris.—J. Pawinski¹ has studied the influence of **dry pericarditis** on the occurrence of angina pectoris and cardiac asthma. He reports a number of cases in which attacks typical of angina pectoris occurred in individuals in whom pericarditis was recognized either at the time or subsequently, usually the latter. The pain often came on in the beginning of the illness, before local signs of any kind were evident, excepting those which occurred with the pain. The diagnosis of angina due to pericarditis may be aided by remembering that, while the attacks of pain are such as those commonly seen in angina, and are associated with intense precordial anxiety, they are also usually accompanied by some fever, and are apt to occur in people who have seemed previously entirely well. Further, they are commonly not much influenced by the usual remedies, such as nitroglycerin and morphin, while such treatment as leeches or wet-cups gives relief at once. A history of catching cold or, often, of tonsillitis, or some other infection, may be commonly elicited, and either at the time or afterward one may usually, if sufficiently careful, discover a pericardial friction-sound. Any change in the position of the patient is apt to cause increase of the pain, and there is oftentimes a most distressing hyperesthesia over the heart. This form of angina pectoris comes in the beginning of the attack, as a rule, and is apt to be relieved by the occurrence of effusion. Very sudden attacks of arhythmia and great weakness of the pulse are apt to occur. The cause of this pain is undoubtedly the irritation of the terminal filaments of the nerves, since these nerves lie directly under the pericardium. In the diagnosis, rheumatism of the thorax may be excluded by the presence of marked changes in the pulse and the abnormalities upon auscultation of the heart; intercostal neuralgia will be recognized by the occurrence of tender points over the nerves, herpes zoster, and the absence of changes in the heart. The possibility of pulmonary embolus may be a point difficult to settle; but if there is present any disease which would likely give an embolus, or if there is spitting of blood, these would be aids. Rupture of the heart gives a similar picture also, but this occurs in more advanced age, the heart does not improve under treatment, and there is a rapid increase in the extent of the heart-dulness, owing to the effusion of blood. Advanced age, with arteriosclerosis and with a pain that is not so pronounced, but is accompanied by more marked alterations in the pulse, are points that speak for an embolus of the coronary arteries as against a pericarditis. The attacks of cardiac asthma which occurred with pericarditis were distinguished by the facts that the breathing was sometimes slow, sometimes rapid; there was marked feeling of anxiety; the countenance was apt to be very pale, the extremities cold, and the pulse small and rapid, thus contrasting with the cyanotic dyspnea of emphysema or valvular disease of the heart. This paleness is due to an irritation of the sensory nerve, which is transmitted to the sympathetic, and especially to the vasomotors; and since the nerves of the heart may be affected in the same way, it is evident that this condition is one of the greatest gravity. If the inflammatory process has affected the heart, the progress of the cases is apt to be extremely rapid and unfavorable.

J. H. Musser² details the histories of a number of cases of angina pectoris, and states that the study of these and other cases has convinced him that with

¹ Deutsch. Arch. f. klin. Med., Sept., 1897.

² Am. Jour. Med. Sci., Aug. and Sept., 1897.

oncoming dilatation of the heart in a case of angina pectoris the painful attacks may subside; and that angina occurring with dilatation of the heart has more favorable prognosis than when it is associated with other conditions, such as myocarditis or hypertrophy. Grave dilatation is more amenable to treatment if the patient should have paroxysms of true angina. Digitalis is of doubtful value in the treatment of angina, and should not be given unless there is extreme dilatation. His most notable conclusions are that the pain of angina is probably due, in many cases at least, to **increased intraventricular pressure**, its causation being comparable to that of glaucoma; and that relief of the pain with the onset of dilatation is due to the relief of pressure, owing to relative incompetency of the valves.

A. Morison¹ gives extensive notes of a case of angina pectoris resulting in death. The left coronary artery was very greatly narrowed, and the right coronary was also narrowed, but less so; the right being pervious to water for about 2 in., the left for 1 in., and then with difficulty. Microscopically, there was a good deal of increase of interstitial tissue, but the muscle was very little affected. The pulse-tracings showed that when the patient was free from pain exhibition of trinitrin caused slowing of the pulse and depression of the diastolic wave, but the latter was not so marked as when produced by the attack of pain. When an attack was allowed to pass off without administration of the drug, the prediastolic wave was more pronounced than when the drug was given to relieve the pain. The latter seems to prove that the vascular impediment in the circulation is decreased by the administration of the nitrites.

J. Knott² reviews the beliefs of earlier authors in regard to the nature of angina pectoris. He believes that there is entirely insufficient proof that it is due to sclerosis of the coronary arteries, and holds that it is the result of neuritis of the cardiac plexus. One of his own cases, previously reported, surpassed the common limit of age, since she was 78 years old. She was English by birth, of high station in life, and of great intellectual activity, as are most of the cases; but, contrary to the usual custom, she was tall and thin. He suggests that the attacks of pain have a similarity to the painful cramps of alcoholic neuritis. Amyl nitrite has been the most satisfactory drug in his hands, while nitroglycerin has been less useful.

Exophthalmic Goiter.—Etiology.—Georgiewsky³ has conducted some experiments which tend to prove that the symptoms of exophthalmic goiter are due to **hypersecretion from the thyroid gland**. Dogs and rabbits were fed with preparations of thyroid, and there followed symptoms which closely resembled those of Graves's disease—*i. e.*, tachycardia, increased respiration, polydipsia, glycosuria, and, later, general depression and disturbances of the digestive organs and of the nervous system, which latter were more marked in young animals than in old ones. When the administration of thyroid was stopped the animals recovered, unless the nervous symptoms were too far developed. In none of these cases was either exophthalmos or goiter produced, however.

A. v. Notthaft⁴ records an interesting case in which a man took for obesity nearly 1000 5-gr. tablets of **thyroid extract** within 5 weeks. After the first 3 weeks he began rapidly to develop the symptoms of acute Graves's disease, with all the characteristic signs. When the thyroid extract was stopped and the patient was put upon arsenic all the symptoms disappeared quickly, excepting the eye-changes and the goiter, which were still notable for about 6 months.

¹ Treatment, Oct. 28, 1897.

² Dublin Jour. Med. Sci., June and July, 1897.

³ Zeit. f. klin. Med., Band xxxiii., Hefte 1 and 2.

⁴ Centralbl. f. innere Med., Apr. 16, 1898.

The headache and pains which are so common in thyroid poisoning were absent, and all the symptoms of exophthalmic goiter were present, so that Notthafft believes that it was actual acute Graves's disease. He expresses the conviction that this disease is due to qualitative changes in the thyroid secretion, and thinks the occasional good effects from the use of thyroid gland may be due to the fact that the patient is unable to secrete the proper quantity of normal product of the gland, and does secrete a product which is abnormal and which causes poisoning. After a very elaborate study of the literature, the author insists that the only theory of causation of the disease that is justified is that it is due to changes in the thyroid gland.

Bérard¹ has observed **fever** in 60% of cases of **partial thyroidectomy**; in 70% after exythyropepy; and in 80% after the whole gland was removed. The remarkable fact about this fever is that there are no associated symptoms, excepting, perhaps, flashes of heat, some excitement, and excessive sweating. The skin may show hyperemia from vasomotor changes, but the tongue remains normal; the alimentary tract rarely shows abnormalities, though when the fever is disappearing diarrhea may be experienced; and there are no changes in the heart and lungs. There is, therefore, no infection in these cases, and they do not correspond to an acute myxedema. Bérard has noticed that the amount of laceration of the glandular tissue which is caused by the operation is proportionate to the occurrence and degree of the following fever, and some persons will acquire fever by taking thyroid extract or iodothyryn, so that the fever seems due to an excessive amount of thyroid secretion set free by the trauma, or, perhaps, by the irritation of the operation. In exophthalmic goiter the thyroid secretion is very poisonous, and he believes that it is the discharge of this secretion into the circulation which causes certain cases of very high temperatures, with frequent fatal issue, which follow operation upon the thyroid gland in this disease.

Eulenberg,² after considering the theories of origin of Graves's disease, states that the most rational is that it is due to an intoxication from the thyroid, which chiefly affects the nervous system. Hence the most rational treatment is that directed toward the nervous system and, if necessary, the removal of a portion of the gland.

Vigouroux³ suggests that Graves's disease is due in some cases to **auto-intoxication**, of probable **intestinal origin**, which especially affects the thyroid. In other cases it is due to an intoxication which is essentially from thyroid secretion, this being, perhaps, of abnormal constitution.

F. Blum,⁴ after an elaborate paper upon the thyroid gland and its functions, concludes that the iodine found in this gland has for its purpose combination with poisonous substances, which combination renders them innocuous. This occurs during the circulation in the blood, and when they are returned to the thyroid the poisonous substances are excreted in harmless form, while the gland retains the iodine.

Symptomatology.—E. H. Sutcliffe⁵ describes a case of Graves's disease in which the rapidity of the course was remarkable, since from the beginning to the fatal issue but 3 months elapsed. The cause seems to have been excessive strain from repeated pregnancies.

J. Hinshelwood⁶ records a case of Graves's disease in which the first symptom was **unilateral exophthalmos**, and he insists upon the importance of recognizing that a unilateral exophthalmos may be the first indication of this

¹ Lyon méd., Dec. 19, 1897.

² Bull. de l'Acad. de Méd., Jan. 4, 1898.

³ Lancet, Mar. 12, 1898.

⁴ Congress of Internal Medicine, Berlin, 1897.

⁵ Münch. med. Woch., Mar. 15, 1898.

⁶ Brit. Med. Jour., June 25, 1898.

disease. An interesting fact noted in this case was that Stellwag's symptom disappeared while Graefe's remained, showing that these two symptoms are independent.

Fevian,¹ in studying the **heart-rhythm** of Graves's disease, finds that there is a change in the rhythm and in the type of contraction, the latter being similar to that resulting from irritation of the vagus. In one case the condition of the heart became normal after thyroidectomy.

Knauer² records the case of a woman of musical education who was herself hysterical and the subject of Graves's disease. Her father was also a nervous subject. The patient had a sudden attack of **amusia**, which consisted of deafness to musical tones. There were also tinnitus aurium and attacks of headache and choking, with unconsciousness, but without aura. Sometimes the ringing in the ears would change into melodious sounds. She could distinguish and understand the voice of one person, but when several talked at once she heard only a confused noise. The author suggests the possibility of the condition being due to thyroid-intoxication.

Treatment.—J. Eliot³ used thyroid-extract in a case of exophthalmic goiter in which sudden swelling of the gland was so severe as to interfere with breathing; and also in a case of acute thyroiditis. In both cases the swelling subsided and the symptoms were relieved.

S. Solis-Cohen⁴ reports the treatment of 12 cases of Graves's disease with **thymus gland**. Six of these were very markedly benefited by this method. F. P. Kinnicutt⁵ has collected 62 cases of exophthalmic goiter treated by the administration of thymus gland. Of these, 36 cases showed improvement; 25 were unimproved and showed aggravation of the symptoms.

G. Maurange,⁶ in order to prepare organic extracts in a permanent and harmless form, has tried the effect of peptonization of these organs, and has in this way produced what he terms **peptothyroid**, **peptovarin**, etc., from which he claims results equal to those following the use of the fresh glands, and without any bad collateral effects.

Posner⁷ believes that the **strength of organic extracts may be tested** by adding to them Biondi's staining-fluid. If nuclein is present in large amount, and the extracts therefore are of good quality, Posner states that they will turn a distinct green.

W. M. Semple⁸ has made use of a modification of the **Schott method** of treatment in managing a case of exophthalmic goiter. The patient was first put upon sponges, and after some improvement baths were used, with the result that she recovered entirely in spite of the fact that she had been absolutely resistant to other treatment.

È. Bertran⁹ reports that he has obtained very satisfactory results from the treatment of Graves's disease by the **galvanic current**. All the symptoms improved, the general health became better, and the thyroid decreased in size.

Matthes¹⁰ has investigated the **metabolism** of a patient with Graves's disease, both before and **after thyroidectomy**. Examination before the operation showed that there was a loss of body-nitrogen. Four weeks after the operation the patient was retaining nitrogen, even up to 25%. Ordinary goiters do not, as a rule, show an increase in excretion of nitrogen before, or decrease after, the operation. Matthes has determined such decrease after thy-

¹ *Gaz. degli Osped. e delle Clin.*, No. 25, 1897.

² *Deutsch. med. Woch.*, No. 46, 1897.

³ *Va. Med. Semi-monthly*, June 28, 1898.

⁴ *Jour. Am. Med. Assoc.*, July 10, 1897.

⁵ *Am. Jour. Med. Sci.*, July, 1897.

⁶ *Gaz. hebdom. de Méd. et de Chir.*, Nov. 14, 1897.

⁷ *Berlin. klin. Woch.*, Mar. 14, 1898.

⁸ *Bristol Med.-Chir. Jour.*, June, 1898.

⁹ *Arch. di Gin., Obst., y Ped.*, No. 5, 1898.

¹⁰ *Congress of Internal Medicine*, Berlin, 1897.

roidectomy in 5 cases of Graves's disease. In one case the administration of thyroid extract after the operation caused the excretion of nitrogen to increase at once.

M. Jaboulay¹ treated a case of severe Graves's disease by removing the superior cervical sympathetic ganglion, after which the patient rapidly improved and the goiter decreased in size almost to normal, but death occurred 10 days later, from congestion of the right lung.

DISEASES OF THE ARTERIES.

L. Spitzer² treats of the diagnosis of **congenital hypoplasia** of the arterial system. The notable points in these patients are that their nutrition is likely to be poor, from the insufficiency of the arterial system, and that they are prone to have sudden attacks of heart-failure, resembling, usually, uncompensated heart-affections, though without the physical signs of any disease of the heart, or, at least, having great incongruity between the symptoms and the evidences of the heart-lesion. Besides these, less important symptoms are that they are apt to be very pale and their hemoglobin to be extremely high—from 90% to 100%. The pulse-tension is apt to be increased, and the radial artery is small; but this latter sign is of little value, owing to variations in the distention of the artery under other conditions than hypoplasia. Edemas are apt to occur, affecting the dependent parts of the body. The diagnosis in the cases in which sudden heart-failure takes place is extremely difficult. [We have recognized several cases during life by the delicate constitution, small pulses, and the elastic character of the pulse.] Spitzer reports 2 cases. The first, a man, 26 years of age, had an attack of gastroenteritis, followed by symptoms of sudden heart-failure, without any definite signs pointing to the heart upon physical examination, and with no signs of hypoplasia. Three days before his death myelocytes were found in the blood and the long bones became painful, so that there was a suspicion of obscure malignant tumor, with metastasis to the bones. Upon autopsy there was found no disease sufficient to explain death, excepting a high degree of hypoplasia of the heart and the whole aorta. This seems to have been a case of sudden failure of congenitally insufficient circulatory organs, owing to the acute gastrointestinal affection. The second case was a woman who was admitted immediately after childbirth in pronounced coma; death followed shortly after. Postmortem there was old endocarditis, with slight hypertrophy and insufficiency of the mitral, together with marked narrowing of the aorta and its branches. In this case the heart-failure seems to have been due primarily to the congenital hypoplasia and immediately dependent upon excessive strain in childbirth.

Montard-Martin and Bacaloglu³ communicate an instance of **arterial hypoplasia** in a girl, 22 years of age, who had been admitted comatose, with rigidity of the neck, unequal pupils, and albuminuria. At the autopsy the thoracic and abdominal aorta was extremely small, resembling that of a child of 12. The left kidney weighed 40 g., the right, 50 g.; they had the appearance of the small red granular kidney of infection, and upon microscopic examination showed intense nephritis. The authors think it improbable that the kidney-affection was subordinate to that of the arteries, but believe it due to a mild intoxication, which was favored and intensified by the small size of the

¹ Presse méd., Feb. 12, 1898.

² Wien. med. Woch., Aug. 28, Sept. 4, 1897.

³ Soc. méd. des Hôp., Feb. 4, 1898.

arteries. Rendu, in discussion, recalled a case that had died of uremia, and at the autopsy showed a small aorta and other arteries.

C. Bäumler¹ contends that **arteriosclerosis** frequently occurs in young adults, and even in children. There may be a diffuse thickening of the arteries, especially the smaller branches, or a production of foci of sclerosis or atheroma in the larger trunks. He thinks that it is caused by infectious diseases or inflammation, and occurs either as an acute arteritis, as endarteritis deformans, or as a slow, diffuse thickening of the walls of the arteries. He insists that the condition should be recognized early, in order to prevent dangerous progress.

C. Beck² finds that **X-rays** are useful in determining the extent of **arteriosclerosis**. In a case which he reports the radials were like pipe-stems, but radiograms taken from other parts of the body led him to believe that the condition was entirely local.

F. Mahuert³ writes of the cardiac form of epilepsy, and especially that subdivision of this form which he calls **epilepsy of arteriosclerotic origin**. Very few such cases have been recorded, but he gives notes of cases of his own, which occurred late in life and were associated with arteriosclerosis, and in two instances with valvular lesions of the heart. For the causation of this form of epilepsy we have sufficient explanation in the weakness of circulation and the sclerosis of the vessels of the brain. The symptomatology of senile arteriosclerotic epilepsy is distinguished by the fact that the attacks come on late in life, occur chiefly during the night, affect males more commonly, and are associated with pronounced arteriosclerotic changes in the vessels. The prognosis is always unfavorable, most of the cases dying not many months after the appearance of the epileptic attacks. The treatment is chiefly the treatment of the arteriosclerosis at first, nitrite of amyl having been, in Mahuert's experience, the most satisfactory drug. Arsenic, however, is found useful. After the strength of the heart has been improved the bromids should be given, in order to control the attacks.

Spencer⁴ describes a case of **arteritis obliterans** which caused gangrene of the left leg and necessitated amputation. There was also disappearance of pulsation and coldness of the right leg and arm, with a suspicion of gangrene, which, however, recovered without amputation. W. G. Spencer⁵ exhibited a man, 27 years of age, who had obliterative arteritis, which had necessitated amputation of the left leg. The artery was found obliterated in the stump. The skin of the right leg also had been cool and had desquamated, but subsequently became normal.

Bourgeois⁶ has made a study of "**intermittent lameness**," which Charcot has described, and which consists of an intermittent paralysis accompanied by pain, and due apparently to sudden obliteration of the arterial supply. All power of motion is suddenly lost in the member, the arterial obstruction being due to atheroma from any cause. The initial symptoms may come on very slowly, with some weakness and fatigue in the limbs; but there may be extreme lameness, particularly upon any unaccustomed effort. After a few moments' rest the condition may pass off. It is apt to come on in crises, particularly in syphilitic cases, and soon there appears a sense of numbness with burning and itching, and the limb becomes stiff, with prominent tendons and severe cramp, usually in the calves and thighs. The skin of the affected limb is often cool, and perhaps cyanosed. General sensation is not affected.

¹ Münch. med. Woch., Feb. 1, 1898.

² Wien. med. Woch., Aug. 14, 21, and 28, 1897.

³ Lancet, Jan. 22, 1898.

⁴ N. Y. Med. Jour., Jan. 22, 1898.

⁵ Brit. Med. Jour., Feb. 5, 1898.

⁶ Thèse de Paris, 1897.

The disease may progress to gangrene. The iodids are indicated, the effect of treatment being often surprising.

Toinot and Griffon¹ observed **acute aortitis** in a patient who died from acute nephritis and erysipelas. There was found old atheroma of the aorta, with patches of new disease.

Reineboth² reports a case in which there was always a noise in the ear with each pulse. This led to investigation of the two pulses, and it was found that the pulse on the left side—that on which the noise was heard—was much smaller than on the right, probably owing to arterial sclerosis of marked degree on this side. He further records some cases of **pulsus paradoxus of one side**. Two cases were due to aneurysm—one to compression from an extravasation of blood, and one occurred with embolism of the left subclavian in a case of endocarditis.

S. Haffner³ records a very remarkable case in which disease of the mitral valves was followed by lodgment of an **embolus** in the left brachial artery, completely shutting it off, but not causing any severe symptoms. The patient complained at once of pain and paresis of the arm, which afterward recovered almost completely. Three years after this the left **common carotid** was suddenly obstructed by an embolus lodging, as was shown 2 years later by the post-mortem, immediately at its origin from the aorta. Within a year there was obstruction of the right brachial by an embolus. A year afterward there was an ingravescent right-sided hemiplegia. The symptoms of all these occurrences disappeared almost entirely, but the patient died within 6 months after the hemiplegia, with a series of infarcts of the lungs and general heart-failure. The embolus of the common carotid seems to be the only case on record. It caused pain in the temple, giddiness, and disturbance of vision, and the carotid pulse could not be felt, but the patient continued at work until 3 days later, when he took to bed for a time.

Ames and Townsend⁴ record a case of **rupture of the aorta** through a calcareous plate in its wall, a little above the valves. There was no aneurysm. They have found about 100 such cases reported, and think it is a more frequent cause of sudden death than is usually believed. In 60% of the cases the rupture occurs near the heart. The most characteristic symptom is severe tearing pain in the neighborhood of the heart, radiating upward or downward. With this there are marked dyspnea and rapid collapse.

ANEURYSM.

H. Toulmin⁵ has examined 75 patients, healthy or suffering from various conditions, in order to learn the **frequency of tracheal tugging**. He concludes that an up-and-down movement of the trachea occurs in many healthy individuals, and in many other diseases than aneurysm. In such cases the extent of movement is much affected by respiration, commonly being present during inspiration alone. In a very small number of cases distinct tracheal tugging may be present without any disease of the aorta, either aneurysm or dilatation. Tugging was distinctly present in 5 of his cases, in 1 of which there was a diagnosis of aortic aneurysm, but in 2 there was probably merely dilatation of the aorta. [Our own experience and that of others agree with the author's. The sign is certainly one of little value.]

J. Masbraunier⁶ records the case of a woman, 27 years of age, who presented

¹ Soc. méd. des Hôp., Oct. 22, 1897.

² Ibid., June 16, 1898.

³ Jour. Am. Med. Assoc., July 3, 1897.

⁴ Deutsch. Arch. f. klin. Med., Apr. 7, 1898.

⁵ Maryland Med. Jour., July 3, 1897.

⁶ Jour. de Méd., June 5, 1898.

the symptoms of sepsis, resulting from an abortion. Death ensued, and there was found an **ulcerative lesion** on the internal aortic valve-segment, and from this extended an opening into an aneurysmal sac, between the aorta and the pulmonary artery, which was about as large as a good-sized egg and was evidently consecutive to the endocarditis, and had developed very rapidly.

R. Y. Aitken¹ records the discovery of an **aneurysm** of the abdominal aorta in a boy, 9 years of age, who had been repeatedly the subject of rheumatism. There was also atheroma of the aorta, and in two places there were beginning aneurysms of the arch. The aneurysm of the abdominal aorta was as large as a golf-ball. It was at the division of the common iliac arteries, and in Aitken's belief probably originated from an embolus which lodged at this point.

A. Fränkel² reports a case of aneurysm of the aorta complicated by **tuberculosis of the lung**. The bronchus on the side on which the tuberculosis existed had been greatly compressed by the aorta, and had caused stagnation of the secretions and given opportunity for development of the bacilli. [In some cases of aneurysmal compression of the bronchus the lung undergoes a form of necrosis very suggestive of tuberculosis, but not really tuberculous.]

R. Lépine³ records a case of aneurysm of the aorta which was interesting from the difficulty in diagnosis. There was marked **expiratory dyspnea**, epigastric retraction, and a little dulness along the border of the sternum; but there was no tracheal tugging, inequality of the pupils, or paralysis of the vocal bands. Tracheotomy was performed; during the operation a pulsating tumor was felt, and sudden hemorrhage caused death. A sacular aneurysm was found, which pressed upon the trachea, and the explanation of the expiratory dyspnea was thought to be that increased intrathoracic pressure during expiration had caused more marked pressure upon the trachea during this period. A second case is noted in which a doubtful diagnosis of aneurysm was made more secure by the use of the X-rays.

L. Boinet⁴ describes a case of aneurysm of the aorta in which the symptoms appeared after an attack of **influenza**, and 2 years after a contusion of the thorax which caused fracture of the third and fourth ribs. The aneurysm formed a tumor in the third interspace, and rupture finally occurred and killed the patient. Boinet, however, believes that the influenza, and not the traumatism, was responsible for the aneurysm.

G. W. Johnson⁵ records a case of aneurysm of the first portion of the aorta, in which the symptoms exhibited by the patient had been marked **bilateral exophthalmos and chemosis**, severe dyspnea, dysphagia, general cyanosis, and edema. The function of the right lung had been completely done away with by pressure.

J. O. Affleck⁶ records an aneurysm of the transverse arch of the aorta which ruptured and caused death by the dissection of the fluid through the mediastinum and up about the pharynx and larynx; death coming on with symptoms of suffocation.

Treatment.—A. E. Taylor⁷ gives the results of his study of the effect upon the blood of the **Tufnell method** of treatment, combined with calcium salts, in the management of 2 cases of aortic aneurysm. Restriction of fluids caused a decrease in elimination of calcium salts, while increase of fluids caused a marked increase in their elimination; but because of the

¹ Brit. Med. Jour., June 25, 1898.

² Rev. de Méd., Jan. 10, 1898.

³ Jour. Am. Med. Assoc., May 21, 1898.

⁴ Rev. de la Tuberculose, Dec., 1897.

⁵ Ibid., Feb. 10, 1898.

⁶ Edinb. Med. Jour., June, 1898.

⁷ Jour. Exper. Med., May, 1898.

effects of large amounts of water upon the absorption of calcium salts he believes that water should be given in abundance, if it is desired to saturate the body with calcium salts. His cases absorbed much more calcium while taking large quantities of water. Ingestion of calcium seemed to increase the quantity in the circulating blood. The specific gravity of the blood was not distinctly affected by the treatment, and since the clinical examination of the blood showed at the same time a reduction in both the number of the red corpuscles and the quantity of hemoglobin, it was evident that the watery constituents of the blood were not diminished. The plasma-nitrogen, plasma-albumin, and the quantity of albumin in the plasma of 100 c.c. of blood, were constant in the 2 cases, except at one estimation. The fibrin-nitrogen was not increased. The time of coagulation was reduced in 1 case, but was not affected by the ingestion of calcium. In the other case the time varied, but was not shortened on the average, and this was particularly noticeable because this was the case that best absorbed calcium. The influence of the treatment upon the blood seemed, therefore, entirely negative, although both patients showed distinct improvement in their physical signs.

H. A. Coulton¹ records a case of aneurysm of the aorta which he treated by **electrolysis**, introducing 7 steel needles into the sac. The treatment was carried out repeatedly, and resulted in very great relief after all other treatment had failed. The local symptoms became less marked, and the pulsation and thrill in particular were greatly decreased.

DISEASES OF THE VEINS.

Béguin² has experimented upon the results of **entrance of air** into the veins and the treatment of this condition. His experiments seem to prove that even a small quantity of air, such as might find entrance during surgical procedures, is sufficient to cause death. The rapidity of death varied with both the quantity of air which entered the vein and the rapidity with which it entered. If the vein were simply held open and the air allowed to enter of itself, death occurred from asphyxia in from 2 to 3 minutes; if the air were blown in quickly through a tube, death occurred even more rapidly; and in either case the right ventricle was filled with blood-stained foam. The air seemed to have interfered with contraction of the ventricles, so that death was due to the impossibility of getting sufficient blood to the lungs. If the ventricle were punctured with a knife, the air escaped, evidently under high pressure, so that Béguin tried the effect of puncture of the ventricles and aspiration of the air, introducing a fine needle at the right border of the sternum and drawing the air into a syringe. This relieved the symptoms at once and permanently in every case in which he succeeded in introducing the needle into the ventricle, and although it does not seem possible to empty the ventricle absolutely in this way, it is probable that it would give enough relief to prevent a fatal result.

Thrombosis.—Helen Baldwin³ reports an instance of a patient with cardiac valvular disease complicated by thrombosis of the **external and internal jugular and subclavian** veins on the left side. She has collected 20 other such cases from the literature.

H. Köster⁴ presents a number of cases of thrombosis and embolism of the larger **abdominal vessels**, and studies the diagnosis of these conditions. A typical case of thrombosis which he describes occurred in a man, 31 years

¹ Mass. Med. Jour., Sept., 1897.

³ Jour. Am. Med. Assoc., Aug. 26, 1897.

² Arch. clin. de Bordeaux, Jan., 1898.

⁴ Deutsch. med. Woch., May 26, 1898.

of age, who, when first seen, had violent pain in the region of the bladder, with severe vomiting and hiccup and signs of intestinal obstruction. Upon celiotomy the greater part of the intestine was found gangrenous, the follicles were somewhat swollen, and there was some ulceration. At autopsy the inferior mesenteric vein was found thrombosed throughout a considerable extent, and there was some thrombosis of the superior mesenteric. The probable cause of this was a preceding enterocolitis. Another case followed operation for intestinal adhesions. Most of these cases present similar symptoms. Köster also records a case of thrombosis of the splenic vein, which occurred during convalescence from typhoid fever, causing vomiting, violent epigastric pain, and enormous swelling of the spleen. There seems to be but one similar case on record.

C. W. Chapman¹ exhibited a case with symptoms of obstruction of the **inferior vena cava** associated with bradycardia. There were swelling of both legs and varicosities of the legs and abdomen. Chapman believes the thrombosis was due to influenza. The condition had begun to develop 6 years before.

J. Ganner and C. P. White² report the occurrence of **thrombosis** of the inferior vena cava in a patient with pronounced cardiac insufficiency and a mitral murmur. The collateral circulation had been so far established that there was no more serious result from the thrombosis than enlarged veins over the abdomen and chest and reversal of flow in them. R. Saundby³ records an instance of thrombosis of the inferior vena cava. The man had marked dyspnea, with cyanosis and edema of the lower extremities; the veins of the legs were varicose and the abdominal and thoracic veins much distended. The liver was enlarged and the urine contained casts and albumin. The heart-action was irregular. The autopsy showed complete occlusion of the inferior vena cava from its beginning up to the point of entrance of the hepatic veins, there being only a small channel in the lower third of this clot, while above this channel the whole mass was organized. The right renal vein was entirely shut off, while the left renal vein was occluded in part of its course.

Borrmann⁴ has investigated the etiology and nature of thrombosis of the **portal vein** of so-called acute and primary origin. The author describes 2 personal cases and 8 collected from the literature. In one of his cases the thrombosis seems to have been caused by a neighboring syphilitic lesion. The symptoms were chiefly distention of the abdomen, ascites, and enlargement of the liver and spleen. The woman was unconscious when first seen. The second case, a man who had been subject to gall-stones, had sudden violent pain in the abdomen, but recovered, and 18 months later had a second attack, in which he died; the portal vein was found thickened and obstructed by a thrombus. In the 20 cases reported, 4 were probably due to syphilis, 3 to chronic peritonitis, 1 to gall-stones, and 1 to pressure from enlarged lymph-glands. In 7 cases there were distinct sclerotic changes in the wall of the vein. The author emphasizes his belief in the frequency of **sclerosis of veins**, which may occur as a primary disease, as does arteriosclerosis, and may result in thrombosis independently of other disease, causing, in the case of the portal vein, sudden abdominal pain, with vomiting of blood and melena, ascites, and, if life be prolonged, tumor of the spleen. If the onset is slow the liver commonly enlarges. The patient may partially recover, but is apt to have another attack, and during the interval the liver is apt to undergo sclerosis.

¹ Lancet, Jan. 22, 1898.

² Ibid.

³ Brit. Med. Jour., Apr. 23, 1898.

⁴ Deutsch. Arch. f. klin. Med., Dec. 9, 1897.

Barth¹ records a case in which portal thrombosis gave rise to symptoms **resembling intestinal obstruction**—i. e., violent epigastric pain with vomiting, in crises occurring daily. The temperature became elevated and the patient collapsed. At the autopsy there was found portal thrombosis, and a loop of the jejunum was almost gangrenous from thrombosis of the mesenteric veins, which was probably secondary to the portal thrombosis.

J. Katz² has recently seen a case of thrombosis of the **femoral vein** which occurred on the day after the crisis of a **croupous pneumonia**. He has been able to discover only 2 previously recorded cases following pneumonia. In 708 cases of pneumonia at St. Thomas's Hospital,³ however, the condition was noted 3 times. [We can recall at least 20 cases, and do not believe the condition as rare as the author states.]

Trosier and Decloux⁴ present the records of their observations upon a case of **phlebitis** of benign nature which **followed an angina** due to streptococci. These organisms were not found in the blood, but they were searched for only when 3 days had elapsed after the disappearance of the angina, and may have been present before.

DISEASES OF THE RESPIRATORY TRACT.

General Considerations.—W. Hutchinson⁵ believes that many **deformities of the chest** may be referred to arrest of the progress of development of the chest at some especial age; the "pigeon-breast," for instance, being a reversion to, or a persistence of, the fetal "keeled" chest. He does not agree with the ordinary view, that the phthisical chest has a small antero-posterior diameter, but, from his measurements, he has concluded that while the chest is excessively long in phthisical subjects, it is even rounder than in normal individuals, its appearance of flatness being due to the projection of the winged scapulae. [Sometimes this may be the case, but it is not true of typical instances.]

E. Schultess⁶ investigated 100 individuals, in as normal condition as possible, in order to determine the **position of the lower border of the lung**. On the left side along the sternum it was on the fifth rib in 66 cases, and in only 22 was it in the fourth intercostal space, and in 12 on the fourth rib. On the right side it was, in 61 cases, on the upper edge of the seventh rib, 15 times in the sixth intercostal space, and 24 times at the lower border, or on the sixth rib. He has also determined the position of the apex-beat, and has found in 50 healthy women in middle life that it was, in 31 individuals, in the fifth intercostal space in the mammillary line. In 6 cases it was further out than this, and in only 7 was it within the mammillary line. In several cases it was in the fourth intercostal space; 3 times in the mammillary line, and 3 times outside.

Müller⁷ has investigated the question of the presence of **bacteria in the small bronchi and alveoli** of the lungs, and reaches the conclusion that normal animals have probably no bacteria in their lungs. This can only be determined in the case of human beings by more extensive investigations upon executed criminals or other individuals who are killed suddenly while in health.

W. J. Harris⁸ attributes all the intrapulmonary **respiratory sounds** to

¹ Soc. méd. des Hôp., Oct. 28, 1897.

³ St. Thomas's Hosp. Rep., vol. xix., p. 269.

⁵ Am. Jour. Med. Sci., Sept. 11, 1897.

⁷ Wien. med. Woch., No. 49, 1897.

² Deutsch. med. Woch., July 1, 1897.

⁴ Soc. méd. des Hôp., June 28, 1898.

⁶ Deutsch. Arch. f. klin. Med., Apr. 7, 1898.

⁸ Brit. Med. Jour., Nov. 13, 1897.

the rush of air through the smaller passages into the larger, and hence believes that the sounds are limited in normal conditions to two—that which arises from the passage of air through the glottis into the larger space of the trachea, and that which occurs when air passes through the smaller bronchioles into the infundibula. The sounds which are heard in amphoric breathing he attributes, first, to the reverberation of the conducted glottic sounds in the cavity, thus making the sound resembling that produced by blowing across the mouth of an empty bottle; and, secondly, to that produced by air passing through a small bronchus opening directly into the cavity.

L. H. Jones¹ believes that the **crepitant rale** is an interpleural sound, and is not caused by the lung-tissue. He bases this belief upon the consideration that the pressure on the air-cells is 15 pounds to the square inch, and it seems impossible that the cells by their elastic force should overcome this pressure. Physiologic teaching, too, shows that motion in currents stops at the bronchi, and only molecular motion takes place below them, so that this motion of the air could scarcely produce sounds by bubbling through liquids. And, too, he has heard the rale in cases in which consolidation was complete. [We have heard crepitant rales when the lung seemed totally solid; but one cannot be certain that consolidation was really complete.] G. E. Caglieri² contends that the crepitant rale is of pulmonary, and not pleural, origin, because it is not present during expiration or during the stage of complete consolidation, at which time the air-vesicles are loaded with exudate. In the instances where it is present in the stage of consolidation he believes it is due to neighboring inflammatory edema, or to the fact that some vesicles are not full of exudate. Also, if, after lying on the back for some time, a patient sits up, crepitant rales can be heard at the base of the lungs, but disappear after a few deep inspirations. [We have very often noted this.] He thinks this is due to a temporary atelectasis.

DISEASES OF THE BRONCHI.

Symptomatology.—Lucibelli³ observed 2 patients who contracted bronchitis, and had severe general depression with comparatively slight signs. Cultures from their sputa showed the presence of pneumococci, and Lucibelli attributes the symptoms to a toxemia produced by these organisms.

J. Lépine⁴ reviews the subject of **pseudomembranous bronchitis**. He divides this condition, according to the etiology, into 5 groups. A certain number are due to infectious diseases; among others, diphtheria and pneumonia. These cases are important from their frequency and severity. Among other causes, measles, small-pox, scarlatina, erysipelas, typhoid fever, tuberculosis, and influenza are named. The second group is less well known, and there are few cases. It includes certain diseases of the heart or of the lungs, noninfectious in character, such as emphysema. The third group includes cases in healthy individuals exposed to poisonous vapors, dust, etc. The fourth group includes those due to iodism and other intoxications. Finally, there is a fifth group (idiopathic), in which the causes cannot be determined. The author then reviews the condition from a clinical standpoint under four headings: first, diphtheritic; second, pneumococic; third, idiopathic; and fourth, chronic.

J. M. Patton and M. Herzog⁵ report a case of **fibrinous bronchitis**. The patient, a man of 40, was well until 2 years before, when he caught a severe cold, since which time he had suffered from bronchitis. About 10

¹ Southern Med. Rec., Aug., 1897.

² Med. Rec., Oct. 23, 1897.

³ Wien. klin. Rundschau, p. 114, 1898.

⁴ Gaz. hebdom. de Méd. et de Chir., Dec. 26, 1897.

⁵ Jour. Am. Med. Assoc., Jan., 1898.

weeks before his attack he began to cough and expectorate large masses of tough sputum, with some blood; then followed high fever, great dyspnea, and harassing cough. The lower part of the left lung did not expand and was dull on percussion. Four weeks later, after a severe cough, a bronchial fibrin-cast was expectorated. Subsequently he spat up considerable blood and bronchial casts. Pathologic examination showed these to be fibrinous. The casts were completely digested by pepsin, and were, therefore, not mucous. A. Habel¹ reports a case in a woman, 41 years of age, who had mitral disease, and had at intervals coughed up casts of the bronchi of various sizes. Study of these showed no fibrin, but the reactions for mucin were easily obtained.

Treatment.—Elberson² recommends **peronin** in the treatment of bronchitis, phthisis, and whooping-cough. He administers it in syrup or in capsules, in a dose of about $\frac{1}{6}$ to $\frac{1}{3}$ gr.

Stumpfl³ has used **peronin** in 40 cases. Its action resembles that of codein, but is less energetic. It, however, reduced cough, decreased expectoration in moderate degree, and decreased pain due to continuous cough. It is also of value in neuralgia and rheumatic pains. It tends, in some cases, to cause severe sweats, especially in the phthisical; and at times irritation of the pharynx, headache, and sometimes itching follow its administration.

A. Goldhammer⁴ uses **guaiaicol** in chronic coughs, even when they are not due to tuberculosis, with encouraging results, giving as much as 15 drops 3 times a day.

Sir D. Duckworth⁵ recommends the use of **fresh snuff**, or of veratrin in starch, in order to assist in the expulsion of tenacious bronchial secretion by the induction of severe sneezing.

P. G. Chalchat⁶ has, at the instigation of Robin, investigated the effects of **emetics** in bronchial affections, and strongly recommends them. He finds that they have an antiseptic effect by clearing the bronchi of infected mucus and other secretions, and by causing a free secretion of fresh mucus, which has itself an antiseptic action. They also increase the respiratory capacity and the pulmonary ventilation, thus increasing the consumption of oxygen and the amount of carbonic acid which is expired. He advises their use in all acute or chronic forms of bronchitis in which the local phenomena are very marked and the dyspnea and depression are severe, and in those cases in which rales are found freely distributed over both lungs.

A. Chaplin⁷ believes that the **surgical treatment of bronchiectasis** can give good results only in those cases in which the dilatation is single, since it would be necessary in other instances, if improvement is to ensue, to tap and drain all the dilated tubes. The most satisfactory treatment he has been able to employ is inhalations of creosote. The unpleasant irritation of the eyes and nose which this treatment usually causes can be prevented by plugging the nose with cotton and covering the eyes with glasses with rubber rims which fit closely to the face.

PNEUMONIA.

General Considerations.—II. L. Elsner⁸ presents a study of his observations upon 150 cases of croupous pneumonia. In 80% of these the onset and course were typical; in 60% the right lung was involved; in 16%

¹ Centralbl. f. innere Med., Jan. 8, 1898.

² Wien. med. Woch., Jan. 1, 1898.

³ Practitioner, Mar., 1898.

⁴ Treatment, Nov. 11, 1897.

⁵ Therap. Monatsh., Nov., 1897.

⁶ Med. Rec., Oct., 1897.

⁷ Thèse de Paris, 1898.

⁸ Med. News, Jan. 8, 1898.

both lungs; in 12 cases there was consolidation at the apex. In influenza-pneumonias the onset was gradual in 30%. He notes great difficulty in the diagnosis of central pneumonia. In 3 cases of pneumonia in old persons the temperature never rose above 100.1° F. In 4 cases there was a post-critical delirium. In 3 cases sudden death occurred, probably from the action of the poison upon the heart. Leukocytosis was present in 22 of 30 cases, being most marked immediately before the crisis; and in all cases examined disappearing 36 hours after the crisis. In pseudocrisis there was no reduction of leukocytosis. Lop and Montoux¹ describe an epidemic of pneumonia in which they observed 25 cases, with 11 deaths. In most of the cases there was opportunity for direct contagion. The disease was remarkable for its gravity and for the involvement of the nervous and circulatory systems. The pulmonary signs were comparatively slight, and appeared only after 2 or 3 days. It is believed that the disease was due either to the grip or to psittacosis; but, at any rate, evacuation of the contaminated quarters led to disappearance of the epidemic. M. Haedke² records the occurrence of 4 cases of pneumonia of peculiar course in one family, which he believes were due to some special infection, as influenza was not prevalent. The prostration was great, the course irregular, and signs of consolidation lobular in character. Three cases died, and the *Streptococcus longus* and a peculiar bacillus, which seemed to be the *Proteus vulgaris*, were obtained. The latter killed guinea-pigs and mice, but the exact nature of the bacillus was not determined. There was a sick parrot in the family, but the stools from this bird did not contain either the proteus or the bacillus of psittacosis.

W. H. Thomson³ notes that the present **course of lobar pneumonia** is often different from the old-fashioned, typical course. In the series of 11 cases which he reports, but 3 had a definite crisis. In 3 others there was a slight crisis, and in 5 none at all. In 8 of the 11 convalescence was tedious. It is suggested that influenza may have some effect in causing this change in the course of pneumonia. The most striking results in treatment that he accomplished were through the use of camphor given hypodermically when there was marked heart-failure. [Undoubtedly the proportion of cases of irregular pneumonia has increased in late years, and the prevalence of influenza may be the cause, though this is difficult to prove.]

Weismayer⁴ discusses the course of **croupous pneumonia**, particularly the form caused by the streptococcus. Of 39 cases of pneumonia which he has observed, and in which he has made bacteriologic examination of the sputum, 34 showed the presence of the diplococcus of Fränkel only. All of these cases terminated before the twelfth day, and in all except 3 that were fatal there was rapid disappearance of consolidation. In 2 cases, besides the diplococcus, the streptococcus was present. The first case was complicated by diabetes, and died on the nineteenth day. The second improved, and slowly recovered after a febrile course of 37 days. In 3 cases the streptococcus was found alone in the sputum. In their symptoms these cases were much like typical, frank pneumonia; but they were remarkable in the fact that the physical signs did not disappear until late. In one case physical signs did not appear until the ninth day, and disappeared only on the thirty-first day. In the two other cases resolution was complete on the nineteenth and twenty-fifth days respectively. Weismayer does not admit that streptococcal pneumonia is always lobular; in his cases it seemed to be lobar. Many of the cases which are reported as streptococcal pneumonia may be instances in which secondary

¹ Quatrième Congrès Franç. de Méd. int., 1898. ² Deutsch. med. Woch., Apr. 7, 1898.

³ N. Y. Med. Jour., Nov. 9, 1897.

⁴ Zeit. f. klin. Med., Band xxiii., Supplement.

infection by the streptococcus has taken place upon the basis of a disease originally caused by the diplococcus.

G. Carrière¹ has made a study of "**Woillez's disease**," or acute idiopathic congestion of the lung, and from his bacteriologic results concludes that it is merely a different degree of the same infection that causes acute pneumonia. Pneumococci were found in 9 out of 14 cases examined; staphylococci in 4. The microorganisms were of remarkably slight virulence, which indicates that it is simply a milder infection than the one that usually causes pneumonia.

Etiology.—B. Robinson² insists upon his belief that pneumonia is **contagious**, and is apt to be communicated to persons near to the patient, so that he thinks patients with the disease should be isolated, and care should be exercised by the attendants not to inhale the patient's breath. Disinfectants, too, should be used about such cases. He thinks that in physicians and others brought in contact with pneumonia mild symptoms often occur, which are probably due to infection with the pneumococcus. In resistant individuals this produces only a mild toxemia, which causes malaise, headache, and a little depression. Robinson believes that the vapor of creosote promotes resolution in pneumonia and has a favorable influence upon the toxemia.

T. Harris³ records a case of seeming **traumatic pneumonia**. Consolidation followed an injury to the chest. The fever became irregular but continuous, the consolidation remained present, and death occurred after 11 weeks. At the autopsy there was found tuberculosis of the left lower lobe, which was the portion that had been consolidated in the beginning. There was also old tuberculosis above. The author believes that the injury caused pneumonia, and that this became infected with tuberculosis. [It does not seem clear that this case was other than one of acute tuberculosis occurring after injury. It is well known that latent tuberculosis may assume an active form after traumatism.]

Prevost⁴ relates the case of a girl, 6½ years of age, who acquired a bronchopneumonia shortly after a severe **gastrointestinal attack**, caused by eating sardines. He believes that the pneumonia was due to the entrance of microorganisms into the lung from the alimentary tract. The child had whooping-cough during the attack, and the whoops disappeared entirely during the pneumonia.

A. M. Pierce⁵ presents a **bacteriologic study** of 121 cases of lobar pneumonia. In 110 of these cases the pneumococcus was found. In 84 instances it was the only microorganism present. In all the other instances the pyogenic microorganisms were found with it, except in 2, in which the diphtheria-bacillus was present. In the complications, which were pleural and pericardial exudates and abscess of the lung, the pneumococcus was found in every case examined. General infection was found very frequently, the pneumococcus being present in the heart's blood 56 times, and in 18 cases it was present in all the great organs. He studied 128 cases of acute bronchopneumonia, of which 82 occurred with the acute infectious diseases of childhood, and 46 with other medical and surgical affections, and generally in adults. Sixty-two of the first class were associated with diphtheria, and in these cases the diphtheria-bacillus was present in the lungs 52 times, in 17 instances being the only microorganism present, and in the other cases being combined with the pyogenic organisms or the pneumococcus. In those bronchopneumonias which occurred principally in adults the streptococcus was found alone in 16 cases, the pneumococcus alone in 12 cases, the Staphylococcus aureus alone in 6 cases,

¹ Presse méd., Jan. 26, 1898.

² Med. Rec., Feb. 19, 1898.

³ Lancet, Apr. 16, 1898.

⁴ France méd., Dec. 10, 1897.

⁵ Boston M. and S. Jour., Dec. 2, 1897.

the *Staphylococcus albus* in 1 case, and the colon-bacillus in 5 cases, while in the other cases there was mixed infection. In the pneumonias associated with a local or general infection the same organism caused both this infection and the pneumonia. If, however, the condition was a chronic or noninfectious process, the pneumonia was usually caused by the pneumococcus. There were 56 cases in which various kinds of disease were produced by the pneumococcus: ulcerative endocarditis, 6 cases; acute meningitis, 5 cases; acute pericarditis, 3 cases; acute fibrinous peritonitis, 6 cases; acute abscess, 6 cases; and numerous other conditions.

J. W. Moore¹ records a number of instances, partly from his own experience and partly from the literature, in which typical erysipelas followed an attack of pneumonia; additional examples of **double infection** in pneumonia are given, in which the influenza-bacillus, the tubercle-bacillus, or the typhoid bacillus was present, and seemed to have caused the disease. He records a series of cases which came from the same street in Dublin, in which series cases of typhoid and of pneumonia alternated. He believes that the typhoid bacillus was the cause of both the typhoid fever and the pneumonia in these cases. After an examination of these, he believes that he is justified in stating that a true pneumonia may occur from the action of either the streptococcus of erysipelas or the bacillus of influenza, tuberculosis, or of typhoid fever. [This opinion is shared by many bacteriologists and clinicians.]

Symptoms and Complications.—Sir W. Broadbent² reports 2 cases of pneumonia which were of interest. In the first case the fever fell to 103° F. on the seventh day, and the next day the physical signs had disappeared, but the fever rose again and continued for some days. In the second case improvement did not occur after the crisis, but hyperpyrexia appeared and the patient became severely dyspneic. This condition is believed to have been due to enlarged bronchial glands which suppurated; and this diagnosis seemed well based, since there were subsequent rupture of pus into the bronchus and recovery of the patient.

A. Stengel³ records a number of cases of **delayed resolution** in pneumonia, and gives his views upon the treatment of this complication. If there is but slight tendency to delay in resolution, and if only a moderate dulness and bronchovesicular breathing persist, symptomatic respiratory exercises are advisable. If there is considerable dulness, active counterirritation by blisters or perhaps the cautery should be practised, and tonics and stimulants administered. The production of aseptic abscesses may be useful. There have been too few cases reported as treated by this method to warrant absolute conclusions, and the treatment is too painful for general application. Stengel used it, however, in a case which he reports, in which resolution was delayed for a month. An abscess was produced by injection of turpentine, and resolution immediately set in and progressed rapidly until it was complete.

S. M. Fortier⁴ observed **relapse** in a case of double pneumonia following influenza. Lysis occurred upon the eighth day of the primary attack, but 6 days later there was sudden onset of new symptoms, with evidences of re-consolidation in the right lung. This persisted for 4 days, after which permanent resolution occurred.

C. G. Stockton⁵ records a case of lobar pneumonia in a child, 8 years of age, in which the upper lobe of the left lung and the middle lobe of the right lung became consolidated and the temperature fell only on the nineteenth day.

¹ Dublin Jour. Med. Sci., Jan. 18, 1898.

² Brit. Med. Jour., Mar. 5, 1898.

³ Therap. Gaz., Feb. 15, 1898.

⁴ New Orl. M. and S. Jour., July, 1897.

⁵ Phila. Med. Jour., June 25, 1898.

Twenty days afterward the left lower lobe again became consolidated coincidentally with a sharp rise of temperature, pulse, and respiration. This attack disappeared after 7 days; but on the fifty-ninth day of illness the temperature again rose, and there were signs of consolidation in the upper lobe of the left lung, the middle lobe of the right, and the upper lobe of the right lung as well. The temperature fell finally on the sixty-eighth day of the disease. It was interesting that in neither of these periods of consolidation was there any leukocytosis. [These cases of **recurrent and allied ambulant forms** of pneumonia seem to be due to some kind of infection different from ordinary croupous pneumonia. The absence of leukocytosis in the case reported is of interest.] T. Oliver¹ records a case of relapsing pneumonia. The man first had signs of pneumonia at the right base, and fairly well-marked crisis occurred between the eighth and the ninth days, and the temperature remained low for 4 days. Afterward it became elevated again, and he passed through another febrile period of 5 days' duration, with new signs at the right apex. After the first crisis the leukocytosis disappeared almost completely. The relapse was not ushered in by a rigor, but there was a fairly rapid rise of temperature, with increased respiration and rusty sputum. This attack ended by lysis, and there was a marked general improvement of the patient which had not been noted after the crisis of the first attack.

C. F. Withington,² in studying **abscess** and **gangrene** of the lung, states his belief that local tenderness is an important sign of abscess. The prognosis of operation varies according to the existence of a general fetid empyema and the presence or absence of adhesions of the pleura over the portion of lung that is affected. If adhesions are not present, empyema is almost certain to result; while if they are present, the outlook is favorable. If there is a fetid empyema, the outlook is bad. T. A. Bowes³ reports the case of a man, 52 years of age, who had probably been suffering from pneumonia for a week, and afterward showed all the signs of rapid gangrene of the lung, with evidences of consolidation over practically the whole of the right side. In spite of the great gravity of his condition he finally recovered entirely. H. M. Fischer⁴ gives notes of a case of severe pulmonary gangrene following pneumonia, which recovered under the use of inhalations of eucalyptol and large doses of creosote carbonate. [We have recently seen 3 cases of pulmonary gangrene or abscess following pneumonia that recovered under ordinary stimulant treatment.]

Aufrecht⁵ records a case in which pneumonia was followed by **empyema**, which improved upon permanent drainage; but subsequently the man's mind became somewhat cloudy, and he died with severe headache and high fever. Purulent meningitis and ependymitis were discovered, and there was an old **abscess** in the situation of the left **caudate nucleus**. In the course of the pneumonia the man for a time had delirium and retraction of the head, and Aufrecht considers it probable that the abscess formed at this time.

F. J. Poynton⁶ records a case of right-sided lobar pneumonia, which was followed by **empyema** and **suppurative pericarditis**, in a girl 4½ years of age. The pericardium and pleura were drained, but the patient died. The pus was found to contain pneumococci.

Kob⁷ records an instance of **thrombosis of the femoral vein** fol-

¹ Lancet, Sept. 4, 1897.

² Brit. Med. Jour., Aug. 21, 1897.

³ Deutsch. Arch. f. klin. Med., Dec. 22, 1897.

⁴ Boston M. and S. Jour., Mar. 10, 1898.

⁵ N. Y. Med. Jour., Aug., 1897.

⁶ Lancet, Feb. 12, 1898.

⁷ Deutsch. med. Woch., Dec. 30, 1897.

lowing pneumonia. Death finally occurred from pulmonary embolism. The author believes that the case was one of influenza with secondary pneumonia.

N. V. Pétrov¹ presents a study of his cases of pneumonia which were complicated by the occurrence of **icterus**. He has seen this complication in 13 cases, 11 of which were right-sided, and 2 on the left. In all these 13 cases he has observed lesions of the biliary passages; in 8 there was catarrhal inflammation of the duodenum, complicated in 2 cases by hypertrophic cirrhosis, and in 5 other cases there was a catarrhal inflammation of the biliary canals. Of 67 cases of pneumonia, 63 were of the right lung, and in 23 it was limited to the inferior lobe. In only 6 was there icterus, and he believes that icterus does not occur in distinct relation with pneumonia of the right inferior lobe. The absence of icterus during the period of resolution has convinced him that the jaundice bears no relation to the absorption of the exudate, and he believes that compression of the biliary canals has nothing to do with it. Animals were injected with the pneumococcus and their blood subsequently injected into others, with the result that there was evidence of hemolysis, but there was never either hemoglobin or biliary pigment in the urine; hence he does not believe that the jaundice is due to hemolysis. He concludes by attributing the complication entirely to disease of the biliary passages. [The author's experiments to prove the relationship of hemolysis are scarcely conclusive, though it seems likely from other considerations that blood-destruction is not the cause of jaundice in this disease.] P. C. Cole² records a case of pneumonia which began with vomiting and icterus. There was first consolidation of the left lung, and this was followed by involvement of the right lung.

Treatment.—J. W. Washbourn³ reports some experiments on the production of **antipneumococcic serum**, the serum he used being obtained from a pony. After 9 months' treatment, first with live and then with dead cultures, the serum was found to have protective power. By using a medium composed of agar streaked with sterile rabbit's blood, he was able to cultivate a pneumococcus of constant virulence. The minimum dose of this culture fatal for rabbits and mice was estimated to contain about 200 living cocci. The serum in varying quantities was mixed with 10 times the fatal dose of the culture and injected into the peritoneal cavities of rabbits, control-experiments being made with the minimum fatal dose. The smallest quantity of serum that will protect animals under these conditions he calls **a unit**, and the most powerful serum he has obtained contained 33 units per c.c. He could not determine any relation between agglutinating power and the protective power of the serum. Having been unable to obtain a satisfactory toxin, he could not determine whether the serum is antitoxic or not. To determine the practical value of the serum he treated 6 cases of pneumonia, some of them exceedingly severe, with the serum, and none of these succumbed. Pane⁴ reports his results in the treatment of 9 cases of pneumonia with antipneumococcic serum. The average dose he recommends is 20 c.c. per day, and he advises that this should be used early, if at all. Death occurred in but one case under his care, and in this the serum was not administered until the fifth day, and then in too small doses. In the other cases rapid improvement followed the use of the serum, and there were no evident ill-effects. A. Fanoni⁵ has used de Renzi's antipneumococcic serum in a case of grave pneumonia of

¹ Gaz. hebdom. de Méd. et de Chir., Sept. 9, 1897.

² Med. News, Feb. 19, 1898.

³ Brit. Med. Jour., Dec. 25, 1897.

⁴ Gaz. degli Osped. e delle Clin., Jan. 30, 1898.

⁵ N. Y. Med. Jour., May 7, 1898.

the left lower lobe, and believes that the favorable result proves the value of this serum. [It was administered daily, however, from the fourth until the ninth day, and the fever did not disappear until the latter date, so that no very definite effect can be claimed.]

Weisbecker¹ has treated 17 cases of pneumonia, which occurred during a severe epidemic, with **serum obtained from convalescents**. The results were most striking, especially the immediate change for the better in the general condition, a number of patients having after the serum-injection no appearance of illness, excepting the fever and the local signs in the lungs. Sometimes the fever became extremely irregular after the injections. If the injections were used early, consolidation did not completely form and soon disappeared; but if consolidation were already partly developed, the local signs became intense, but the general symptoms did not appear in grave form. The only fatalities, 2 in number, occurred from complications, in both cases cardiac insufficiency; one of these patients having emphysema and the other being 78 years of age. Some astonishing changes in the patients after the injections are described at length.

M. Rosenbergen² has used **pilocarpin**, after the manner of Sziklai, in treating 9 cases of croupous pneumonia, and has, during this time, treated 16 cases by expectant methods. He does not think that the pilocarpin caused the consolidation to disappear more rapidly than did the other treatment, nor does he believe that any of the symptoms were distinctly improved by the pilocarpin, and his general impression was that the treatment was less effective than expectant treatment, and, too, it often caused salivation and made the patient constantly miserable.

Huber and Blumenthal³ have treated cases of several infectious diseases, most notably pneumonia, with **blood obtained from convalescents** from the same diseases. The blood was at first mixed with sodium chlorid in equal amount. Subsequently chloroform was added, and it was then put aside for 24 hours. It was then gently pressed through sterile linen and filtered through sterile sand, and if it still contained hemoglobin it was filtered a second time. Of 13 cases of scarlet fever treated with this blood-filtrate from convalescents, 3 showed a distinctly favorable effect. In the remainder the result was uncertain, but in 9 cases the temperature declined earlier than usual. Nine cases of measles were treated in this manner. Favorable effect was seen in 2 or 3 only, but the fever always declined by the third day. Among 14 cases of pneumonia there were but 2 deaths. In 11 the crises occurred between the third and the eleventh days; and in 4 there was a very marked decline following the injection, and the general condition improved distinctly. No results were obtained in cases treated with blood-filtrate from convalescents from other diseases. The blood-filtrate from pneumonia protected rabbits from infection with the pneumococcus. In 10 cases of erysipelas no favorable results could be seen.

De Becker⁴ has for 2 years treated pneumonia with **salicylic acid**, and has had distinctly favorable results. He finds that it increased expectoration and liquefaction of the exudate, the sputum becoming very liquid; and he thinks that the salicylic acid acts partly as an antiseptic and partly by aiding nature in breaking up the exudate and liquefying it. It also causes some cough, and thus expulsion of liquefied exudate. He gives about 7 gr. every

¹ Münch. med. Woch., Feb. 15 and 22, 1898.

² Deutsch. Arch. f. klin. Med., Dec. 22, 1897.

³ Berlin. klin. Woch., Aug. 2, 1897.

⁴ Ann. et Bull. de la Soc. de Méd. d'Anvers, Feb. and Mar., 1898.

2 to 3 hours to adults. Severe cardiac disease and extreme weakness contra-indicate this treatment.

R. Liegel¹ has used large doses of **sodium salicylate** in pneumonia; he believes that he has distinctly modified the disease by this treatment. There was no crisis in any of the cases, but the temperature fell within 2 days. A number of typical recrudescences occurred, but were controlled by the same medication.

Rubel² strongly recommends **large doses of digitalis** in the treatment of pneumonia, as he had a mortality in 1192 cases of but 2.66%. He gives from 1 to 3 drams per day, and believes that the disease usually will be controlled entirely within 3 days. M. Eustace³ states that he has for over 2 years used large doses of digitalis (30 minims every 2 to 4 hours) in pneumonia, and has had good results. He believes that the drug is better tolerated in pneumonia than in other diseases.

J. A. Cutter⁴ records a case of grave pneumonia with influenza, in which on the fifth day immediate improvement ensued upon the use of **nascent ammonium chlorid**, which was extemporaneously prepared by saturating cloths with ammonia and hydrochloric acid and bringing them together.

H. A. Fairbairn⁵ admits the value of very small and frequently repeated doses of morphin in pneumonia, for the purpose of relieving cough and stimulating for a brief period; but he considers that the free use of opium in any form or its administration in large quantities is dangerous in either the croupous or the catarrhal form.

A. F. Foxwell⁶ contends that pneumonia frequently calls for active and **energetic interference**. For pleural pain he uses leeches or a cantharidal blister and gives aconite in repeated doses, watching its effects carefully. He endeavors to control the inflammation of the lung by use of the cold pack. Insomnia is best controlled by the same means.

L. F. Bishop⁷ advises the use of the **cold tub-bath** in pneumonia if the patient's circulation is in fairly good condition. For restlessness and delirium he uses the bromids in large doses, and finds them effective and without danger. [We cannot regard tub-bathing as a safe method of treatment. In one case within our knowledge sudden death followed a bath.] J. Eichberg⁸ treats pneumonia with baths at a temperature of from 95° to 110° F., continuing the bath for 10 minutes, and having the patient rubbed vigorously after removal from the tub. The temperature is frequently but little improved at the time, but often declines at once. The respirations improve immediately, and in many cases large quantities of urine are excreted after the baths are instituted. The pulse improves in quality rather than in frequency. The number of baths should be determined by the general condition of the patient rather than by the range of temperature. Of 90 cases treated in this way, 71 recovered and 19 died.

ASTHMA AND EMPHYSEMA.

Kingscote⁹ contends that many cases of **asthma** are due to irritation or compression of the vagus. In support of this he adduces observations of cases of asthma caused by compression of the vagi in their course by tumors, and

¹ Wien. med. Woch., May 7, 1898.

² Brit. Med. Jour., June 25, 1898.

³ Brooklyn Med. Jour., Nov., 1897.

⁴ Med. Rec., Aug. 14, 1897.

⁵ Proc. Internat. Med. Congress, Moscow, 1897.

⁶ Albany Med. Ann., July, 1897.

⁷ Treatment, Aug. 27, 1897.

⁸ Jour. Am. Med. Assoc., July 17, 1897.

⁹ Brit. Med. Jour., Apr. 2, 1898.

other instances in which asthma occurred with a dilated heart and improved when the dilatation was relieved. In the latter instances he believes the enlarged heart had compressed the trunks of the nerves. In discussion, Maguire pointed out that there was negative pressure in the thorax, which would tend to diminish pressure upon the vagi, and, therefore, enlargement of the heart could scarcely produce marked pressure on these nerves. If the asthma were due to pressure on the vagi, physiology would lead one to expect purely expiratory dyspnea, but this is rarely seen. Sihle,¹ in discussing the causation and treatment of asthma, states that he believes that the affection is due entirely to spasm of the muscles of the bronchi, but this spasm may be of a neurogenous, hematogenous, or psychic origin. The author especially insists upon the occurrence of the latter form, and contends that asthma is frequently the result of hysteria, neurasthenia, or other emotional states, and that suggestion and psychotherapy should always be used at first, as it is often possible in this way to control the attacks quickly.

M. Sanger² insists that **dyspnea** is often purely subjective in patients with loss of sensibility of the mucous membrane of the upper respiratory passages, since they cannot feel the passage of the air, and this lack of sensation leads to a feeling of dyspnea. The only treatment for this condition is local applications of the mucous membrane.

Revilliod³ has treated asthma with **antidiphtheritic serum**, with immediate cessation of the attack and postponement of recurrence, and in some cases entire cure in a short time. He was led to use the serum because of the similar eruptions sometimes observed in cases of asthma and after the use of the iodids and diphtheria-serum. He believes that asthma is caused by a poison which bears some relation to the serum. [The author's opinion seems to rest upon rather uncertain foundation.]

H. Campbell⁴ holds that the essential factors in the enlargement of the chest in **emphysema** are loss of pulmonary elasticity and dyspnea. The chief things to be looked after in the treatment are preservation of the elasticity of the lungs; prevention of excessive action of the costal elevators, thus checking thoracic aspiration; and the maintenance of the normal mobility of the thorax. This is done by hygienic measures and abstention from exercises tending to increase the trouble, such as blowing wind-instruments, running up stairs, and hill-climbing. The expiratory muscles should be systematically exercised by encouraging deep expiration. External compression of the thorax during expiration is also valuable.

Foreign Bodies in the Lung.—G. A. Himmelsbach⁵ was consulted by a girl who complained of periodic dyspnea, violent cough and wheezing. There was a suspicion of the lodgement of a foreign body in her lung, but there was no physical sign of importance, except that there was bronchial and asthmatic breathing, which was located entirely in the left lung. Her condition remained constantly distressing for nearly 6 months, when suddenly, after considerable effort and with violent paroxysmal cough, she expectorated a **molar tooth** which had been removed 6 months previously under anesthesia, and had evidently lodged in her left bronchus at that time. [In a recent case under our observation a foreign body which had lodged in the right bronchus was coughed up after 3 weeks. The conclusion to be drawn from such cases is that expectant treatment is generally advisable.]

¹ St. Petersburg med. Woch., Nos. 44 and 45, 1897.

² Munch. med. Woch., Apr. 12, 1898.

⁴ West London Med. Jour., July, 1897.

³ Rev. med. de la Suisse Roman, Nov. 20, 1897.

⁵ Buffalo Med. Jour., Aug., 1897.

A. B. Francis¹ records a case of foreign body impacted in a bronchus for over 3 months. The patient fainted while smoking a pipe with a hard-rubber stem: $1\frac{1}{4}$ in. was broken or bitten off in his fall, and evidently lodged in the lung, causing no definite physical signs, but dyspnea and a good deal of pain and expectoration. The foreign body was expectorated 3 months after it was inspired, when the patient, after severe exertion, had a sudden fit of coughing. Although the body was $\frac{1}{2}$ in. in width, it had caused but slight dyspnea, and this Francis would explain by the fact that the perforation in the stem probably admitted nearly enough air to the lungs.

Arnold² reports a case of **lung-stones**, in the form of lenticular necrosis from impregnation with stone-dust and consequent local necrosis of the pulmonary tissue. The lung was found at autopsy to contain 70 black irregular stones, some of which were as large as 7 mm. in diameter. They were formed by calcification of lung-tissue and subsequent necrosis, which cast them loose. W. Mager³ records the history of a woman of 28, who had had pneumonia in early childhood. Shortly before the time reported she had paroxysmal attacks of coughing, and often expectorated lung-stones, which varied in size from 0.5 to 1 cm., and were composed of calcium and magnesium phosphate, with a little calcium carbonate and organic matter. This case seems to be one of primary broncholithiasis, since it was preceded by no recent disease excepting slight bronchitis, and the patient did not live nor work in a dusty atmosphere.

A. Brosch⁴ gives a brief history of a man who suddenly fell dead while convalescing from diphtheria. Postmortem examination showed that his respiratory passages were filled with **stomach-contents**, and since his heart was found nearly normal there was no other explanation of his sudden death than the presence of foreign matter in his bronchi and trachea. The question arose whether it was not possible that the **artificial respiration** by Silvester's method, which had been undertaken when he fell immediately before his death, had aspirated the stomach-contents into his respiratory passages. Brosch, therefore, undertook to investigate the possibility of this occurrence by performing artificial respiration upon 6 dead bodies, and he discovered that in each case the stomach-contents were aspirated in considerable quantity into the trachea and bronchi. Counter-experiments to determine the possibility of aspirating the contents again out of the respiratory passages showed that it was impossible to remove substances after they had once gotten into the smaller bronchi. It was also evident, from the first series, that in order to produce aspiration of the stomach-contents, it was not necessary that the stomach should be filled. The use of artificial respiration on the living subject seemed to be even more apt to cause aspiration of the stomach-contents than would this procedure in dead bodies. Those methods which cause diaphragmatic movement are especially dangerous. Brosch investigated various methods of artificial respiration, and found that all are unsatisfactory unless, before they are undertaken, a tube is introduced into the esophagus which is of sufficient length to project well out of the mouth, and thus to carry off aspirated stomach-contents. These investigations emphasize again the necessity of having the stomach entirely emptied before operation.

J. Hlava⁵ records an instance of **pneumokoniosis** in a potter, which was caused by **aluminum silicate**. There were at the postmortem examination numerous indurated, grayish-green nodules in the lungs, which were heavy and

¹ Brit. Med. Jour., Sept. 25, 1897.

² Münch. med. Woch., No. 47, 1897.

³ Wien. klin. Woch., Mar. 17, 1898.

⁴ Deutsch. Arch. f. klin. Med., Sept., 1897.

⁵ Gaz. hebdom. de Méd. et de Chir., Sept. 9, 1897.

firm. The bronchial glands were enlarged and distinctly greenish in color. Chemical examination showed that the ash of the right lung weighed about 28 g., of which over 13 g. were aluminum silicate. The microscopic examination showed the presence of 3 pigments—coal-dust, iron, and another consisting of large granular or crystalline bodies, which were composed of aluminum silicate.

Atelectasis.—Rohmer and Borchert¹ record a case of pulmonary atelectasis of great extent, the normal resonance being replaced by flatness over the whole of the left lung and the respiratory murmur being weak, while the heart was dislocated to the left by the distended right lung. At the autopsy the left bronchus was found contracted and the lung collapsed and sclerotic. There was slight pigmentation of the left lung, and from this it is decided that the organ once functionated, and that early in life the bronchus was constricted and the lung collapsed. It was thought to be probably of specific origin. The right lung was enormously hypertrophied.

Actinomycosis.—Karewski² records an extremely interesting case of actinomycosis of the lungs, which was successfully treated by an extensive operation. The disease had caused the appearance of a large tumor on the right side of the chest anteriorly, and Karewski operated by making an incision from the junction of the second costal cartilage with the sternum to the posterior axillary fold, removing the whole mass of diseased tissue beneath and a large part of the third to the seventh ribs inclusive. He then cleared out the diseased portions of the pleura, and with the cautery eradicated the disease of the lung, leaving a cavity larger than one's fist. It was very remarkable to note that though during the operation the patient had been allowed to come out of the anæsthetic, owing to shock, he nevertheless complained of no pain. Subsequent shock was severe, but the patient recovered, and at the time of writing, about 5 months later, there were no remains of the old disease, and excepting for some muscular atrophy, owing to the operative procedures, the patient had no difficulties beyond a small bronchial fistula, which was rapidly closing over. The author insists that all cases of actinomycosis should be operated upon as soon as the diagnosis is made. G. R. Butler³ records a case of actinomycosis of the lung occurring in a man who had been injured by a falling board. He developed irregular fever, with cough and offensive expectoration. Some weeks later the actinomyces was found in the sputum and the lung was determined to be consolidated at the apex. The treatment consisted of administration of oil of eucalyptus; gradual improvement took place, and eventually recovery occurred.

Anthrax.—Petrov⁴ records a case of pulmonary anthrax which resulted in death on the fifth day, and in which the symptoms consisted of chilliness, pains in the side, and severe dyspnea. There were no lesions of the skin and no definite signs of anthrax, but at the autopsy numerous anthrax-bacilli were found in the lymphatics of the lungs.

Malignant Tumors.—Milian and Bernard⁵ record the history of a woman of 28, who died of a rapidly growing **sarcoma** of the lung. During life the disease had been thought to be infectious endocarditis. The sickness had lasted 4 months, and the symptoms consisted of severe fever, dyspnea, cyanosis, and profuse hemoptysis. Toward the end paraplegia developed. At the autopsy the whole right lung was found transformed into a white mass with a soft center. The left lung was involved to a certain extent, and there was a

¹ Deutsch. Arch. f. klin. Med., Dec. 22, 1897.

² Berlin. klin. Woch., Apr. 11, 18, and 25, 1898.

³ Arch. Russe de Neurologie, No. 32, 1897.

⁴ Med. News, Apr. 23, 1898.

⁵ Bull. de la Soc. et Anat., May 6, 1898.

tumor of the spinal dura mater which compressed the cord. The histologic examination showed that the tumor was a round-cell sarcoma. F. A. Packard and J. D. Steele¹ give a careful record of a case of sarcoma of the lung, in which marked pigmentation of the skin occurred. During life the diagnosis of primary sarcoma of the lung, with metastasis to the suprarenal glands was made, and this was confirmed postmortem, excepting that the disease was primary in the periosteum of the femur, and secondary metastasis had occurred in the lung and suprarenal glands as well as in numerous other locations.

G. Greenwood² records a case of **cancer** of the mediastinum which had extended into the substance of the right lung. The chief symptoms during life had been chills, dyspnea, and cough, with subsequent swelling of the veins and neck, and, shortly before death, phlebitis of the left subclavian vein.

DISEASES OF THE PLEURA.

Pleurisy.—Etiology.—Le Damany³ studied 80 cases of pleurisy, of which 54 were primary, and concludes that the *role* of cold or of the rheumatic diathesis is almost *nil* in the causation of primary pleurisy, and that one may almost always discover a tubercular soil in these cases. The exudate of 55 pleurisies examined gave in 47 cases evidence of tuberculosis when injected into guinea-pigs. Four of the negative results were sterile upon culture, but tuberculous clinically. The author concludes that serofibrinous pleurisies due to microbic invasion are tuberculous. Other microorganisms cause only purulent pleurisies. [Other observers do not support the author in the proportion of cases he finds tuberculous.]

P. A. Lop and G. Monteux⁴ record a case of **staphylococcus-pleurisy**, and describe the pleurisy due to staphylococci as being one which is of very slow development and prolonged course. The fluid formed in such cases is at first serous, and subsequently becomes purulent, and it is somewhat notable in the fact that it does not contain flakes of fibrin, but is apt to remain very fluid. It is formed in large quantities. Staphylococcus-pleurisy usually does not develop unless the individual is previously in bad health; but when developed it is apt to be grave in prognosis because of its prolonged and debilitating course. It frequently resembles tuberculous pleurisy; the diagnosis is often very difficult, and sometimes can be made only by injections of tuberculin.

Symptomatology.—A. Pitres⁵ has made an elaborate **study of the dulness** which occurs with pleural effusion. He has introduced fluids, which solidified when cold, into the pleural cavities of human cadavers, and finds that vertical small effusions occupy the groove between the diaphragm and the ribs in the axillary region, and have a horizontal upper border. In the supine position the fluid sinks to the groove between the ribs and the vertebræ. Larger effusions occupy much the same position, extending, of course, when they become considerable; but it is notable that in the erect position, with large effusions the upper line of the fluid turns downward abruptly when near the vertebral column; this is probably due to the greater difficulty in displacing the lung in this region. The form of these artificial effusions was modified by pneumothorax, adhesions, thickening of the lungs, or increased resistance of the diaphragm. The lower border was concave in small effusions; convex when they were larger. Clinical observations have given Pitres the same results. He notes that in some cases there is a semilunar area of subresonance above the dull area, and this is

¹ Med. News, Sept. 11, 1897.

³ Presse méd., Nov. 24, 1897.

² Brit. Med. Jour., Nov. 6, 1897.

⁴ Rev. de Méd., Apr., 1898.

⁵ Arch. clin. de Bordeaux, Dec., 1897.

probably due to pulmonary collapse. Potain¹ directs attention to the fact that in pleural effusions the compression of the lung is limited to certain portions, since some parts yield more readily than others, and the parabolic curve which represents the surface-level of the fluid in certain cases is caused by the varying compressibility of the different parts of the lung. If atelectasis is suspected in an old effusion, no more than half of the fluid supposedly present should be withdrawn at once, as the sudden alteration of pressure may give rise to serious hyperemia or to hemorrhage. If the effusion is considerable, paracentesis should not be delayed more than 3 weeks, lest permanent atelectasis occur.

Glaeser² contributes an article on **serous pleurisy**. After analyzing 209 cases, of which 10 died, 142 fully recovered, and the remainder were improved, he makes a special study of the condition of the urine. In many of the cases the amount of urine was even increased with existing effusion, though in other cases large amounts of fluid were absorbed at times without any increase in diuresis. On the other hand, there was, in some instances, diuresis of marked degree without any absorption of fluid. The latter cases are probably connected with such an overfilling of the vascular system that only a considerable period of diuresis could relieve the pleural effusion. Absorption usually began with the fall in temperature, though this varied. He does not believe that aspiration should be done in serous cases unless the quantity is so great as to endanger the immediate existence of the patient. [The duration of the effusion is certainly important, as Potain insists, in determining the advisability of paracentesis.] Recently he has come to consider the prognosis in hemorrhagic pleurisy better than he had previously held it. Of 9 cases of this form, 6 were cured; and in some of these cases tubercle-bacilli had been found in the exudate.

J. N. Hall³ records the case of a boy, 5½ years of age, whose family history was tuberculous, and who showed the signs of a serous pleural effusion; but his temperature became irregular and the whole left side—that on which the effusion was present—**pulsated**, and there was edema over most of the pulsating area. Operation was undertaken and pus was evacuated. At the time of the operation the pulsation had disappeared: this was probably due to the fact that at the last examination the child was lying flat, while at the first it was sitting up; perhaps also to the fact that the temperature was lower at the last examination and the cardiac action less excessive. The intrathoracic pressure was increased, and the fluid escaped in a jet when the cavity was opened.

PNEUMOTHORAX.

Reineboth⁴ has investigated the **Valsalva test**, which consists in making a forced expiration, with the mouth and nose held closed, after a deep inspiration. Normally the pulse-curve became increased in height. His investigations were chiefly upon pneumothorax, and he finds that this test may be used to determine the possibility of inflation of the compressed lung, if there is no large opening between a bronchial trunk and the pleura.

J. N. Finney⁵ records an interesting case of a stableman who had felt oppressed over his chest upon rising in the morning, and had subsequently violent pain. Upon examination it was discovered that he had a pneumothorax. No effusion came on and the air was entirely absorbed. No cause could be

¹ Sem. méd., Nov. 10, 1897.

² Therap. Monatsh., 1897.

³ Med. News, July, 1897.

⁴ Deutsch. Arch. f. klin. Med., Apr. 7, 1898.

⁵ Dublin Jour. Med. Sci., Apr. 1, 1898.

found for it. After recovery, while doing some heavy lifting, he felt a "crackle" at the top of his chest, and developed once more a pneumothorax on the same side (the left). He recovered entirely. There was a metallic tinkle to be heard for days, but there was no other evidence of fluid. It is very remarkable that the pleura was filled to its extreme limits, the lung collapsed, and the heart displaced to the right side, and that this caused only momentary difficulty in breathing and a little discomfort.

R. Kaenbock¹ records the case of a man of 24, who had a closed pneumothorax of the left side. He studied this with a fluoroscope, and found that there was vertical movement of the upper surface of the fluid upon respiration, probably due to the fact that in this disease the diaphragm is convex below; hence in contraction it moves upward. The pneumothorax pulsed; this was observed to be due to direct transmission of the cardiac impulse, and not to communication of an impulse from the air to the fluid, since the pulsation ceased entirely when the patient lay on his left side, and thus left the heart entirely surrounded by air. This is valuable proof of Traube's belief that pulsation of an empyema is due to direct transmission of an impulse from the heart.

Widal and Nobecourt² record the case of a man, 40 years of age, who had signs of pneumothorax, and upon aspiration was found to have extremely **fetid liquid** in the pleura. He died before the pleural cavity could be opened, and, postmortem, there was discovered no trace of pulmonary gangrene or perforation, but a foul pleurisy. There had been a gaseous tumefaction at the point where the puncture was made, and in the pleural fluid the authors found, besides streptococci and staphylococci, a bacillus belonging to the order of *Proteus vulgaris*, which produced a fetid odor in cultures. The serum of the patient had no agglutinative action upon this proteus. Oclard³ had observed a similar case in a young physician who had fetid pleurisy, and who was operated upon and the cavity drained, entire recovery ensuing. Courtois-Suffit reported a similar observation which occurred in a man of 23 years, who had at first an ordinary acute pleurisy, which afterward became of grave character, the liquid being fetid. This patient also had a gaseous abscess at the point of puncture, and died in spite of operation. There was no gangrene of the lung or pleura. Bacteriologic examination showed a large number of microorganisms.

Treatment.—K. Pitchler⁴ records the results of his treatment of 13 cases of empyema and pneumothorax by **permanent drainage**. Five cases were cured, 6 died, and 2, the latter tuberculous, improved, but subsequently showed amyloid degeneration. The gravest complication in this condition is the appearance of fetid pus. This requires immediate thoracotomy. Permanent drainage is most valuable in recent cases, though it is often successful in the latter forms, and the author suggests that purulent peritonitis should sometimes be treated in the same way. He has used the treatment in 1 case, with satisfactory results. Leroux⁵ records a case of hydropneumothorax in a tuberculous girl, which was entirely cured by paracentesis 2½ months after perforation of the lung occurred.

TUMORS OF THE PLEURA.

A. S. Warthin,⁶ after **microscopic examination of the exudate** from a large number of cases of pleural effusion, and having succeeded in making

¹ Wien. med. Woch., June 2, 1898.

² Ibid., Dec. 16, 1897.

³ France méd., Sept. 3, 1897.

⁴ Soc. méd. des Hôp., Dec. 3, 1897.

⁵ Deutsch. Arch. f. klin. Med., Dec. 22, 1897.

⁶ Med. News, Oct. 16, 1897.

a diagnosis of primary sarcoma of the pleura in 1 case by this examination, concludes that if fixed cover-glass preparations of the fluid are made immediately after its withdrawal, in order to preserve the appearance of mitosis, the diagnosis may be usually made. In early simple pleurisy the exudate contains endothelial cells and no fibroblasts. In fibrous pleurisy, either tuberculous or septic, the sediment contains endothelial cells and numerous fibroblasts. In sarcoma the presence of a large number of round or spindle-cells, often in bunches, and the occurrence of frequent mitoses, will make the diagnosis positive. Mitosis is the most important evidence, as this rarely occurs in any other disease.

F. G. Finney and W. I. Bradley¹ record a case of **primary sarcoma of the pleura** which occurred in a man 67 years of age. There were signs of great thickening of the pleura on the left side, and, upon tapping, bloody serum was withdrawn. Subsequently there were rapid and repeated collections of fluid, and the man died of exhaustion. Postmortem the left pleura was found universally thickened and studded with white nodules, which were seen upon microscopic examination to be sarcoma, containing round and oval cells and a large number of giant cells. The left lung was entirely collapsed. There was no metastasis, except in one bronchial gland. The authors introduce a summary of 6 cases of primary sarcoma of the pleura.

G. R. Butler² records a case of **endothelioma** of the pleura which occurred in a man of 48, who had signs of pleurisy, with effusion and thickening. Some slightly turbid, straw-colored fluid had been obtained by aspiration, and later the man showed signs of tuberculosis of the lung, with tubercle-bacilli in his sputum. Some improvement occurred, but death ensued 4 months later, and there was found a dense yellowish growth in the left pleura, involving the pericardium and compressing the lung, which was tuberculous. The growth in the pleura proved to be an endothelioma. The tuberculosis of the lung made the diagnosis extremely difficult.

MEDIASTINITIS.

G. A. Sutherland³ diagnosed as chronic mediastinitis the case of a boy of 8 years, who had swelling of the abdomen, prostration, and dyspnea, with cyanosis and distention of the superficial veins, harsh breathing, and slight dullness at the left base. The heart was somewhat enlarged and there were no murmurs. There were paroxysms of cough, with paroxysmal dyspnea. Cirrhosis of the liver was excluded, as was peritonitis, and after considering other conditions the author believes that it was chronic inflammation or a growth in the mediastinum.

DISEASES OF THE MOUTH AND PHARYNX.

A. J. Sharp⁴ records an instance of **xerostomia**. The dryness of the mouth had been present for 18 months. The tongue was red at the tip and had prominent papillæ, but there was no appearance of inflammation. The salivary glands seemed to have no secretion. The lacrimal secretion was normal, the senses of taste and smell were not altered, and the nasal secretions were normal, as were those of the skin. The condition was believed to be due to nervous changes. T. Harris⁵ also records an instance of xerostomia.

¹ Practitioner, Aug., 1897.

³ Lancet, Jan. 8, 1898.

² N. Y. Med. Jour., Feb. 19, 1898.

⁴ Ibid., Apr. 23, 1898.

⁵ Am. Jour. Med. Sci., Mar., 1898.

With the dryness of the mouth, the teeth had become diseased and had crumbled away. The woman had lost her sense of taste, and the sense of smell was present in only one nostril. The author gives the records of 12 other cases, and states his belief that the disease is not dependent upon disease of the parotids alone, but considers it due to affection of the nerve-supply of all the glands of the mouth.

Colleville¹ has used hydrogen peroxid and electricity in the treatment of an extremely obstinate and painful case of stomatitis which resembled **leukoplusia**. After resisting all other treatment it yielded to this, and he believes that the electricity was the most effective portion of the treatment.

E. J. Kiepe² has investigated the various amounts of **hydrochloric acid** which he could add to a mixture of starch and saliva without preventing the formation of **maltose**. It was discovered that in a mixture of equal parts of boiled starch and saliva, 16 parts of a 2:1000 solution of HCl were necessary to prevent the diastatic action. The same was true of a 4:1000 solution, but stronger solutions stopped diastatic action in smaller amounts inversely proportionate to the amount of HCl which they contained.

William Osler³ describes, under the title "**Chronic Symmetric Enlargement of the Salivary and Lacrimal Glands,**" a case which he has mentioned in his *Text-book* under the title "Chronic Parotitis," and in which there had been for nearly a year enlargement of all the salivary glands, the lacrimal glands, the buccal mucous membranes, and the spleen. Subsequently he discovered that Mikulicz described the condition as a form of chronic disease previously unrecognized. In his case the patient, a man of 47 years, had symmetric enlargement of the lacrimal, and subsequently of the salivary, glands. Kümmler has recently met with a series of cases, and collected one or two previously described. Briefly, the history of Osler's case was that for more than a year there had been enlargement of the lacrimal, salivary, and buccal mucous glands; enlargement of the spleen, syphilitic rhinitis, tuberculosis of the pleura and lungs, followed by death. The patient was a negress 11 years of age. She had not complained of any pain, but had slight sores in the mouth and a discharge from the nose. The glands underwent no special change from March until June. When he saw her, in October, the right parotid was smaller than the left, and the sublingual and submaxillary glands had in the meantime grown. There was no anemia, and the leukocytes numbered 10,300 per c.mm. at the highest. Potassium iodid and mercurial inunctions were used on account of nasal and buccal inflammations, which were regarded as specific, and in the course of some months the enlargement of the glands disappeared. Finally the patient became tuberculous and died. At the autopsy the lacrimal glands were replaced by fibrous structure; there was no trace of any enlargement of the salivary glands.

Richardière⁴ describes a case of uremia in which there were dyspnea and pain at the angle of the jaw, with swelling of the parotid glands. This persisted for 4 or 5 days, and then vanished. The cause of **parotid swelling in uremia** may be excessive secretion, or, as is quite frequent, and was the case with this patient, when the secretion is not increased the condition is probably due to qualitative changes in the saliva. A. D. Atkinson⁵ notes that there seems to be a relation between the parotid gland and the generative organs, and he especially points out that this gland seems to show a sympathy with disease of several of the abdominal viscera. He reports a case in which

¹ Gaz. hebdom. de Méd. et de Chir., Mar. 24, 1893.

² Am. Jour. Med. Sci., Jan., 1898.

³ Bull. méd., Aug., 1897.

⁴ Jour. de Méd.

⁵ Bull. Johns Hopkins Hosp., Oct., 1897.

parotitis followed a case of supposed gastric ulcer, and another case in which the same complication occurred with a post-typhoidal cholecystitis. [Parotid swellings have been frequently described as occurring in cases of abdominal disease and after operations in the abdominal cavity.]

F. C. Coley¹ protests against sending all cases of **toothache** to dentists. Some of these aches are real neuralgia, and should be treated as such. Of all remedies he has found sodium salicylate the best, though exalgin, while uncertain, will oftentimes greatly relieve the pain. This may be due to hyperacid gastric juice, when alkalis are in place; and temporary relief when the tooth is at fault will usually be obtained from the application of carbolic acid to the cavity or of cocaine to the gums.

Feilberg² notes the case of a man, 42 years of age, who had had for several months periodical attacks of **hiccough**. Feilberg discovered a tumor at the base of the tongue, which was due to hypertrophy of the **lingual tonsil**; upon removal of this the hiccough ceased.

M. P. Busquet³ has discovered an instance of **epidemic** appearance of **tonsillitis**, which he believes shows that the disease is not dependent upon cold for its origin, but upon microorganisms. In a company of soldiers, quartered in barracks recently disinfected, there were at first a few cases of tonsillitis, and after a few days these cases rapidly increased. Soldiers quartered in tents near by, although exposed more severely to cold, acquired no tonsillitis. The other conditions were practically identical; hence Busquet believes that infection was partly propagated by contagion from man to man, and partly through dust, etc., carried into the barracks, and gradually infecting the rooms which had been recently disinfected.

F. Jessen⁴ records 4 cases in which the **tonsils** were the port of entry for an infection which resulted in **septicemic conditions**, and he insists upon the importance of examining the tonsils in such cases, and particularly mentions the fact that suppuration may exist within the tonsils without any external evidence of it. He believes that those exudates which appear on the tonsils in streaks, similar to those which one sees in culture-tubes, and tend to go deeply into the tonsils, are to be regarded with suspicion from the beginning. The cases which he describes were in 2 instances accompanied by membrane-formation on the tonsils, due to pus-cocci, and in these there were evidences of general infection, with inflammations of the serous membranes, cutaneous eruptions, pains, and hemorrhages, but recovery ensued. Two other cases, both due to abscesses within the tonsils, died, and pyemic abscesses were found scattered throughout the body.

DISEASES OF THE ESOPHAGUS.

Claribel Cone⁵ reports a case of **tuberculosis of the esophagus**. The patient was admitted to the hospital with tuberculosis of the right testis and with moderate involvement of the apex of the right lung. The diseased testicle was removed and the wound healed promptly. Some months later, however, the patient returned to the hospital, suffering from tuberculosis of the left testis, and the pulmonary condition advancing, he died. At the autopsy generalized tuberculosis was discovered, the lesions of interest being nodular elevations occupying the lower two-thirds of the esophagus. These were found to be enlarged lymphoid follicles invaded by miliary tubercles.

¹ Practitioner, Sept., 1897.

² Med. Times and Hosp. Gaz., No. 1013.

³ Gaz. hebdom. de Méd. et de Chir., Oct. 24, 1897.

⁴ Münch. med. Woch., June 7, 1898.

⁵ Bull. Johns Hopkins Hosp., Nov., 1897.

The case is of interest from the facts that the invasion was evidently hematogenous and that the miliary tubercles occupied the lymphoid follicles. The author has collected and classified 28 cases in addition to the 19 reported by Flexner in 1893. Of these, only 1 is admitted to be distinctly hematogenous in origin. The usual mode of infection is by swallowing sputum. [A few cases of secondary involvement of the esophagus through the lymphatic channels have been recorded.]

M. Einhorn¹ finds that the **esophagoscope** may usually be readily introduced, and he has given up the attempt to construct a flexible instrument. He considers the instrument of marked diagnostic and therapeutic importance, and has recently established a diagnosis of cancer at the cardia by means of its use. He believes it is an instrument that has come to stay.

C. Bruns² describes a case with a tumor in the neighborhood of the gall-bladder, and marked ascites, in which fatal collapse came on quite suddenly. This was found to be due to hemorrhage from rupture of an **esophageal varix**, which was due originally to cirrhosis of the liver.

E. Summa³ describes a case of **stenosis** of the esophagus of remarkably **long duration**. The patient drank some lye when 2 years of age. Twelve years later difficulty in swallowing had become great, and some relief was obtained from dilatation. Fourteen years later he had pain in the epigastrium and an area of dulness in this region, with coffee-ground vomiting; gastro-enterostomy was undertaken, but the patient died. There were a circular scar in the esophagus an inch below the pharynx, and a second stricture, which ran all the way from the bifurcation of the trachea to the cardia. There were also an old gastric ulcer, and an ulcer in the duodenum; the author considers that these ulcers were due to the ingestion of the lye.

J. Netter⁴ reports a case of **dilatation** of the lower end of the esophagus, and reviews other cases reported, concluding that in the etiology of the condition the original fault is either spasm of the cardia, in which there results hypertrophy of the muscular layer of the esophagus, and which the postmortem will reveal as this form of the affection, or a primary atony of the esophagus. The latter is the more favorable form for treatment, since it is easier in this case to introduce food into the stomach through a tube.

G. A. Wright and R. Smith⁵ describe a case of esophageal **diverticulum**. The patient when 7 years old had swallowed a toy disc of metal, but there were no symptoms until he was 35, when difficulty in swallowing, and regurgitation of portions of liquid swallowed, occurred. This regurgitation was aided by pressure on the side of the neck. A. Reitzenstein⁶ reports a case of diverticulum of the esophagus which was of sacular form. The diagnosis was positively established by introducing one tube into the diverticulum and another into the stomach, the latter having numerous openings along its sides. The fluid introduced into the diverticulum could be siphoned back through the same tube, but it never passed into the stomach through the holes in the second tube; and fluids of different colors when introduced through the two tubes never became mixed. The gastrodiaaphane showed a bright area at the lower end of the sternum, and when examined with the fluoroscope one could see a metallic stylet which had been introduced into the sac, and which showed the rounded form of the sac.

Kohlenberger⁷ reports an interesting method of establishing a diagnosis

¹ N. Y. Med. Jour., Dec. 11, 1897.

² Deutsch. Arch. f. klin. Med., Dec. 22, 1897.

³ Arch. f. Verdauungskrankh., Band iv., Heft 2.

⁴ Münch. med. Woch., Mar. 22, 1898.

⁵ Deutsch. med. Woch., Apr. 7, 1898.

⁶ Brit. Med. Jour., Apr., 1898.

⁷ Deutsch. med. Woch., June 9, 1898.

of a **fistula between the esophagus and trachea**. The symptoms in a case under his observation had been pain upon swallowing and frequent severe cough, and the patient had been observed to cough up wine or other colored fluids which had been swallowed. The diagnosis was established by introducing a stomach-tube, keeping the upper lateral opening directed toward the trachea, while a lighted candle was held in front of the external end of the tube. The patient was directed to breathe deeply; during inspiration the flame of the candle was drawn in and during expiration blown out, until a point opposite the fistula was reached, when suddenly the light was blown out. This occurred upon repetition of this examination, and at the post-mortem the fistula between the trachea and esophagus was found due to carcinoma.

H. Zeehuisen¹ records his **treatment** of 2 cases of impassable stricture of the esophagus, resulting from swallowing lye. They had been entirely resistant to other treatment, so that he made use of the treatment of König, having the patients swallow **silver balls** fastened to a silk thread. These balls ranged from 2 to 7 mm. in diameter, and at first the smallest ball was swallowed at night. It reached the stricture, rested there, and in the morning was found to have passed into the stomach. It was then withdrawn, and a larger ball was next used, the size being increased until the stricture was of such diameter that a tube could be passed. He considers this method extremely valuable.

Rosenheim² recommends the **cauterization** of esophageal strictures by introducing a solution of silver nitrate (1-5%). The dysphagia becomes less, and with this the necessity for cauterization diminishes. One may also use the galvanocautery, introducing it through the esophagoscope. [Such methods of treatment do not seem rational, to say the least.]

DISEASES OF THE STOMACH.

Methods of Examination.—Winkler³ publishes a new method for the determination of the presence of **hydrochloric acid** in the stomach-contents. The filtrate of the latter is put in a porcelain dish, a little dextrose is added, and to this a few drops of a 5% alcoholic solution of alpha-naphthol. After heating, one sees a bluish-violet ring about the edge, which becomes darker, passing through various shades. This is characteristic of a mineral acid only.

F. B. Turek,⁴ in order conveniently to gain a knowledge of the **reaction of the gastric juice** and the presence of free acid, has devised an **instrument** which consists of a small rubber tube, through holes in which project pieces of congo-paper, litmus-paper, or paper saturated with other suitable reagents. This tube is enclosed, with a thread attached, in a gelatin-capsule and swallowed, being removed again after a few moments, when the reaction of the gastric contents and the presence or absence of free acid may be determined at a glance, thus doing away with the necessity for the use of the stomach-tube for determining these points, and also excluding the possibility of the irritation attending the introduction of the stomach-tube modifying the condition of the gastric contents. [Methods similar to this have been suggested before, but have not met with favor.]

D. L. Edsall,⁵ after a quantitative investigation of the comparative delicacy of **Töpfer's reagent** (dimethylamidoazobenzol) and other substances

¹ Centralbl. f. innere Med., Jan. 15, 1898.

² Berlin. klin. Woch., Nov. 15, 1897.

³ Centralbl. f. innere Med., No. 89, 1897.

⁴ Jour. Am. Med. Assoc., Apr. 23, 1898.

⁵ Univ. Med. Mag., Sept., 1897.

used in testing for hydrochloric acid in the stomach-contents, concludes that Töpfer's reagent is extremely delicate, though slightly inferior in this respect to a solution of congo-red. Either of these substances is of sufficient or more than sufficient delicacy for the discovery of free acids in the stomach-contents. The paper prepared from a solution of Töpfer's reagent is not sufficiently delicate for clinical use. But the reagent reacts to lactic acid in such small quantities as to invalidate it as a test for free HCl in stomach-contents. He believes that it has no advantages over congo-red, and has the disadvantage that the final reaction is much more difficult to recognize in doing quantitative work. When lactic acid is absent from the stomach-contents he prefers that titration in estimating free HCl be done by using 1 drop of congo-red as an indicator. Investigation of this method has convinced him that it gives accurate results. For qualitative estimation of free HCl he recommends the more extended use of Boas's resorcin solution. It is very slightly less delicate than Günzberg's reagent, is much cheaper, and can be preserved much longer.

J. Ehrmann¹ discusses the relations between **deficiency of HCl in the stomach-contents and combined HCl**. Deficiency of HCl is generally estimated by determining the quantity of HCl that must be added to the stomach-contents having no free HCl before the reaction for free acid is obtained. His own view is that it represents the difference between the amount of HCl that may be combined by the stomach-contents and the amount already combined. In all cases it is understood that the test is made after the use of Ewald's meal. After investigating a number of cases, he concludes that the limit of the gastric contents for combining HCl is from 0.05% to 0.07% of HCl. The establishment of this limit is of value in cases in which a certain deficiency in HCl is obtained: for example, if the deficiency in 5 c.c., titrated with $\frac{1}{10}$ normal HCl solution, amounts to 0.02%, he assumes that there already exists in the form of combined HCl 0.04% to 0.05%. This was determined, not alone experimentally *in vitro*, but also in examination of patients. [These tests may have a certain scientific value, but it is not apparent that they have a distinct practical usefulness.]

A. L. Benedict² describes a **ready test for the degree of acidity of the gastric contents**. He administers sodium bicarbonate and auscultates over the stomach. In normal conditions a fine crepitation is heard; while if there is excessive acidity this is heard sooner and is louder, and lasts longer. In anacidity there is no crepitation. He admits that excessive acidity from fermentation might readily lead one astray. [The method seems rather crude and uncertain.]

Kadner,³ in order to determine the **amount of stomach-contents** present in any case, administers to his patient a solution of sodium phosphate of known strength just before a test-meal is expressed, and then calculates the amount of contents by determining the dilution that has occurred in this solution of sodium phosphate when the stomach-contents are expressed immediately afterward. He thus estimates the amount of fluid that was present in the stomach from the amount of dilution. He admits that abnormal motility or malformations of the stomach might make this method extremely unreliable. V. Mering⁴ finds from his experiments that the emptying of the stomach depends upon the amount of contents in the duodenum. The stomach-contents remain in the stomach until the small intestine becomes emptied, and this is the case even when the pylorus has been removed or gastroenterostomy has been done. When the stomach is emptied the contents are removed by

¹ Berlin. klin. Woch., Dec. 20, 1897.

² Deutsch. med. Woch., Mar. 31, 1898.

³ Medicine, Feb., 1898.

⁴ Congress of Internal Medicine, Berlin, 1897.

rhythmic contractions. The author, in order to determine the **absorptive power** of the stomach, introduces a mixture of alcohol and sugar and removes it after 2 or 3 hours. He then determines the proportion of these substances present, and from this reckons the amount of absorption.

Roux and Balthazard¹ **observed the movements** of a dog's stomach by means of the **fluoroscope**. After they had introduced food and bismuth subnitrate they found that food collected along the greater curvature, and that in the pyloric region there were intense peristaltic movements. The presence of chyme in the duodenum did not prevent peristaltic movements in the stomach.

M. Levy-Dorn and I. Boas² have prepared gelatin-capsules into which bismuth is introduced, the **capsules** being subsequently **coated with celluloid** to prevent their digestion. The position of a capsule is **observed with the fluoroscope** at various times after it has been swallowed. The authors believe that if a capsule remains in the stomach for more than 24 hours this indicates pyloric stenosis; and they suggest that the method might be of use to determine the position of a stenosis of the intestine, by noting with the fluoroscope at what point the capsule is arrested. This should, however, be done only before operation is practised, as the capsule might lead to complete obstruction.

C. L. Leonard³ states that in 1 case of **gastroptosis** he was able to obtain a good view of the location of the stomach by first washing it, and subsequently introducing an emulsion of bismuth, and then examining the patient with the fluoroscope.

Boardman Reed⁴ describes a **new intragastric electrode**, which is said to be more readily removed from the stomach than the old form, and to be safer, as well as more readily introduced. Reed believes that the Faradic current tends to lessen excessive gastric secretion, and should be watched to see that it does not too much reduce the functions of the gastric glands.

Prevost⁵ gives a digest of the results of the experiments of Pawlow and Nencki upon the **secretion of gastric juice**. They established fistulæ in dogs, and also gave them food after tying the esophagus. Food taken in the mouth caused secretion of gastric juice, which they believed was due to psychic influence, since the quantity secreted varied with the kind of food taken. In order to cause this secretion by masticating food the vagus must be intact and a psychic stimulus is necessary, since introduction of food through the fistula did not result in secretion. Fat introduced into the stomach diminished the secretion of gastric juice, probably owing to the presence of inhibitory fibers in the gastric nerves. The composition of the gastric juice varied in the same animal, differing according to the kind of food taken. The whole process of secretion is believed to be reflex, and the secretory nerve-fibers are thought to reach the stomach through the vagus, though some juice may be secreted after the vagus is cut, so that some fibers must run elsewhere. Stimulation of the peripheral end of the cut vagus caused secretion of mucus as well as of gastric juice.

Oppler⁶ reviews the literature upon the subject of **gastrodiaphany**, and reaches a number of interesting conclusions. The instruments of Kuttner and Jacobson and of Meltzing are preferable to others, and a light stronger than 4-candle power should not be used, as stronger lights give deceptive

¹ Bull. de la Soc. de Biol., July 10, 1898.

² Deutsch. med. Woch., Jan. 13, 1898.

³ Jour. Am. Med. Assoc., Dec. 4, 1897.

⁴ Phila. Med. Jour., Mar. 26, 1898.

⁵ Rev. Méd. de la Suisse Romaine, Oct. 20, 1897.

⁶ Arch. f. Verdauungskrankh., Band xxx., S. 334.

results. The results in cases with thickened abdominal walls are also apt to be erroneous. The stomach should be clean and the bladder empty, and the illumination should be undertaken in both the horizontal and erect postures. If the lamp is then allowed to glide along the greater curvature, the bright spots seen will approximate the position of this curvature. The lower boundary of the stomach is certainly lower, at least in some cases, than has been previously supposed, but the depth of its position has been exaggerated, and there are probably many errors in these observations. The light-area moves distinctly with respiration, excepting in complete ptosis, when movement is, at any rate, very slight. The most valuable use for the diaphane is to define the position of a gastric tumor, or, perhaps, to aid in the discovery of one otherwise difficult to demonstrate. Tumors of the liver or spleen, or enlargements of these organs, may also be discovered, and an enlargement of the stomach may be made out. The degree of respiratory mobility of the area of light is not sufficient to establish a definite diagnosis between dilatation, megalogastria, and gastropotosis, since all of these may have limited mobility. As a final conclusion, the author strongly emphasizes the fact that transillumination cannot replace other methods of examination of the stomach, and may often be entirely dispensed with, though it sometimes gives useful results. [A careful study of the merits and deficiencies of the method does not indicate that it is necessary to a proper knowledge of gastric diseases.]

A. Schmidt¹ discusses the demonstration and value of **mucus in various excreta**. For the demonstration of its presence he advocates the color-reaction obtained with Biondi's mixture. Using this in the testing of sputum, for example, the body of the sputum assumes a green color when it consists mainly of mucin from the bronchial mucous membrane, and a red color in cases of nuclealbumin and fibrin from the alveoli. The failure to find mucin in the excreta does not necessarily imply its absence, as he has been able to demonstrate artificially the digestibility of this substance and its destructibility by microorganisms, and therefore believes the same process possible in the living body.

Gastritis.—Treitel² directs attention to the importance of **nasal disease** in causing disorders of the stomach. Not only does the obstruction in the nose prevent proper mastication, but the hawking from secretion dropping in the pharynx often causes vomiting and irritation of the stomach, and the decomposed secretions which are swallowed further upset the stomach. In some cases the unpleasant odor from these secretions causes anorexia.

A. Robin³ discusses **latent dyspepsia** and its **relation to skin-eruptions**. He mentions the case of a man of 75, who had psoriasis, and who was found to have no digestive ferments in his gastric juice, though he made no complaint of disturbed digestion. Robin believes that in many cases digestion is imperfect, but no symptoms on the side of the digestive organs appear. The most frequent symptom which latent dyspepsia causes is constipation.

Kuttner⁴ contributes an important paper upon **gastric disturbances from hernia**, particularly from hernia in the epigastrium along the linea alba. These are very often extremely small, and may be multiple. They are apt to occur in men of the working-classes and during the working-age. They usually consist of subperitoneal fat alone. The symptoms are chiefly

¹ Deutsch. med. Woch., Jan. 6, 1898.

² Arch. f. Verdauungskrankh., Band iii., Heft 3.

³ Progrès méd., Mar. 19, 1898.

⁴ Mittheil. aus dem Grenzgeb. der Med. u. d. Chir., vol. i., No. 5.

attacks of colicky pain, with vomiting, and the condition is very apt to suggest ulcer or a neurosis. Sometimes it resembles gall-stones or renal colic. The diagnosis will usually be made by the discovery of the tumor or the marked local tenderness. Operation is the only treatment of value. [We have very frequently found cases of this sort unattended by any symptoms.]

C. D. Aaron¹ records an instance of hernia of the linea alba which had caused severe digestive disturbances. These ceased completely after removal of a small mass of subperitoneal fat which had projected itself through a very small opening in the linea alba.

J. C. Brown² records the case of a man who swallowed a corrosive poison, but recovered from the immediate effects. About 10 days afterward he had severe hemorrhage from the stomach, and afterward vomited what was found to be **the mucous membrane of the esophagus and stomach**, the whole mass being about 16 in. long. Microscopic examination of it was made, and confirmed the macroscopic diagnosis. Hemorrhage was severe for 36 hours, after which it ceased. He subsequently took large quantities of food, but did not digest it, and soon died of progressive exhaustion. The esophagus had meanwhile contracted so considerably that a tube could not be passed. A postmortem was not allowed.

T. E. H. Fisher³ records the case of a man of 56, who had been subject for years to attacks of pain and distention after taking food. These were relieved by vomiting. During one of these attacks he passed into collapse and died. The autopsy disclosed a **diaphragmatic hernia and perforation of the stomach**. The hernia seemed to have been congenital, and the perforation was supposed to have caused death.

Functional and Neurotic Disturbances.—Klippel and Merklen⁴ discuss **paroxysmal thirst**, and report 2 cases in which this symptom came on brusquely, lasting but a short time, but being irresistible during this time. The first patient was of neuropathic ancestry, and had hysteroepileptic attacks. In this case the paroxysmal thirst seemed to be comparable to the aura which often precedes these attacks. In the second case, also an hysteroepileptic, but with diabetes insipidus, there were an aura in the form of a sensation of heat in the pharynx, and an odor of cooking. In this case the attacks of polydipsia came on after the convulsive attacks.

Nebelthau⁵ records the case of a woman who was greatly emaciated, and whose breath had a marked odor of acetone; the urine gave a marked reaction for diacetic acid. She frequently vomited; the vomitus contained acetone, but there was no sugar in the urine. Investigation of the metabolism showed that during periods of vomiting, when very little food was taken, there was a large amount of acetone, diacetic acid, oxybutyric acid, and ammonia in the urine, and the amount of urine excreted was very small, and albumin and casts were present. When vomiting was controlled by cocaine and suggestion and sufficient food was taken there was retention of nitrogen, and the acetone and excessive ammonia disappeared. The case was diagnosed **hysterical vomiting** and consequent inanition.

Fichaux⁶ describes a number of cases which he has collected, in which there occurred attacks of **gastralgia** of peculiar form, which he considers were **epileptic**. One case, as an example, would suddenly cry out with severe epigastric pain, become pale, and lose consciousness for 2 or 3 hours.

¹ Med. Rec., Nov. 20, 1897.

² Lancet, Dec. 18, 1897.

³ Centralbl. f. innere Med., Sept. 25, 1897.

⁴ Ibid., Oct. 9, 1897.

⁵ Jour. des Prat., Mar. 9, 1898.

⁶ Thèse de Lille, 1897.

After regaining consciousness she felt fatigue and headache for an hour or two. These attacks were controlled by the use of the bromids.

Courtin¹ describes the case of a child of 13, who, after having typhoid fever, had attacks of severe pain in the neighborhood of the umbilicus, not accompanied by either diarrhea, vomiting, or fever. Subsequently there was an attack of right-sided acute pleurisy, followed by repeated eruptions of purpura, and blood was afterward vomited and passed in the stools. Treatment for scurvy caused improvement, but the child did not grow entirely well.

Raulin mentioned a case, in discussion, in which similar attacks of **gastro-enteralgia with purpura** occurred in a young girl at the time of the appearance of the **menses**. The patient died shortly after the onset of the attacks, having passed from observation. Venot described a similar case in a woman of 29, who was profoundly hysterical. The bleeding lasted 18 months, and finally killed her.

Rosenheim,² in considering **nervous dyspepsia**, insists upon the necessity for the limitation of this diagnosis. It is difficult to determine whether there is really mild inflammation or not, but he contends that in the neurasthenic a very mild inflammation might produce morbid symptoms, which would not appear in ordinary individuals with so slight a lesion, and he also insists that inflammatory changes readily arise in neurasthenics. Hyperacidity is but a symptom, and undoubtedly frequently a symptom of genuine gastritis, though it is common in real nervous dyspepsia. Rosenheim has, however, constantly become less inclined to look upon permanent hyperacidity as due to nervous dyspepsia. In diagnosis the results of treatment give valuable indications, since the inflammatory cases usually improve when upon Carlsbad waters and similar measures, while the nervous cases usually grow worse upon such treatment. In 50 cases of neurasthenia Rosenheim found 38 who had dyspeptic symptoms, but in only 11 were these of purely nervous origin. The motor functions may be diminished in neurasthenia, but accurate examination will often determine that this depends upon atony, which is in such case the important element in the gastric condition.

H. J. Hamilton³ calls attention to the fact that **hyperchlorhydria** is not a disease, but merely a symptom of many morbid gastric conditions. He divides it into 3 forms—simple hyperchlorhydria, which is present only during digestion; a second form, which occurs in crises, often with attacks of migraine; and a third form, in which there is at the same time hypersecretion both during and after meals, and which is associated with some dilatation of the stomach. In the second form he excludes those cases which are evidently dependent upon organic nervous disease. An interesting example of the third form is recorded, in which the vomit was so acid that after its passage through the pharynx and mouth the mucous membrane often peeled off "like wet tissue-paper." The patient had distinct attacks of tetany, in which the contractures were not confined to the extremities, but affected the back, face, and tongue as well. There was also, at one time, a severe attack of herpes zoster. There was apparent recovery, with fair health, and death took place 7 years later from apoplexy. G. Liebmann⁴ has become convinced of the existence of a catarrhal as well as a neurotic form of gastric hyperacidity. The symptoms, which are somewhat characteristic of the catarrhal variety, are its more frequent association with anorexia, coated tongue, vomiting, and intolerance of nitrogenous food, while mucus is present in considerable quantities in

¹ Gaz. hebdom. de Méd. et de Chir., May 5, 1898.

² Berlin. klin. Woch., Nov. 1, 8, and 15, 1897.

³ Canad. Pract., July, 1897.

⁴ Boston M. and S. Jour., Nov. 4, 1897.

the gastric contents. It does not respond to nervines, electricity, etc., but is benefited by long-continued lavage. The contrary of all these points is true of the neurotic form, the nervines, electricity, massage, etc. controlling it better than any other treatment. Mucus is absent from the stomach-contents, and there are peculiar nervous disturbances of appetite, such as bulimia. [It is difficult to determine which condition is the antecedent in some cases, the hypersecretion or the structural changes met with.]

J. C. Hemmeter,¹ from the **examination of fragments of mucosa** from 20 cases of hyperacidity, concludes that there must be two forms of this condition: one due purely to nervous influences, the other depending on changes in the gastric mucosa; the first, however, having a tendency to become organic. Four of his 20 cases showed normal mucosa, 2 atrophy, 6 hyperplasia of the chief glandular cells, and 8 hyperplasia of the parietal cells. Since dogs fed upon proteids have, in his experiments, a larger percentage of HCl in the stomach-contents than those fed upon carbohydrates; since intestinal putrefaction is increased by a diet composed chiefly of proteids, and the signs of putrefaction are decreased by the addition of carbohydrates; and since he finds many cases of hyperacidity do better on a diet containing a considerable amount of carbohydrates, he advises that the latter form of food be included in the dietary in considerable amount, tentatively at least, although in all cases it is better to put the patient occasionally upon an absolute fluid diet for a few days.

Oettinger² discusses the gastric crises which Leyden has termed **periodic vomiting**. These attacks resemble the crises of tabes dorsalis, and may occur in organic nervous disease, but are more common in the neuroses, and must often be diagnosed from hysterical vomiting. This is chiefly done by the fact that the hysterical form lasts for a long time, as a rule; while the idiopathic lasts from a few hours to a few days, and is accompanied by excessive secretion of hyperacid gastric juice. He attributes the disease purely to neurosis of the gastric nerves, and compares it to the attacks of salivation which may occur in facial neuralgia.

W. S. Fenwick³ describes a condition in children simulating migraine, which he believes is due to **paroxysms of gastric hyperacidity**. The condition may commence at any period of childhood, but is most common between the ages of 4 and 10. The attack is usually preceded by good health, though occasionally there are malaise, want of appetite, and other mild symptoms. Mental and physical fatigue are the chief conditions that seem to induce the occurrence of paroxysms, but indiscretions in diet or prolonged excitement may be responsible. The onset is marked by severe headache appearing early in the morning or shortly after the noontime meal. The pain is frontal or occipital at first, but soon becomes diffuse; moving about increases it. Sharp screaming and even partial aphasia may suggest meningitis. After an hour or two burning pain in the epigastrium occurs; the child flexes the knees and clasps the arms over the belly; later the stomach and bowels become distended with gas; scalding pain occurs behind the sternum, and eructations, nausea, and giddiness supervene. Later the stomach is emptied, apparently without effort, but a choking and burning are left in the throat, and the attack subsides. A little fever and occasionally slowness of pulse and other symptoms may occur. The vomit often shows marked hyperacidity. The diagnosis is mainly concerned with the distinguishing of this disorder from migraine, which usually comes on later in life and is preceded

¹ Arch. f. Verdauungskrankh., Band xiv., Heft 1.

² Sem. méd., July 4, 1897.

³ Lancet, Jan. 8, 1898.

by ocular symptoms absent in the condition under discussion. There is not the prompt relief from drinking tepid water in migraine, and the gastric symptoms are wanting. Excessive HCl is not discovered in the vomita. With regard to treatment, he advises potassium bromid with liquor potassa, and at the beginning of an attack administration of anti-pyrim or phenacetin. After the onset of the attack lavage with alkalies is most useful.

Talma¹ does not believe that **fermentation of carbohydrates** is so frequently due to preexisting disease of the stomach as it is the cause of such disease, resulting in distention, spasm of the pylorus, and retention of food. It may lead to hyperchlorhydria, and at times to ulcer or to stricture of the pylorus, and the intoxication that results from the fermentation may readily injure the mucous membrane and cause a gastritis.

M. Herz² exhibited a case of **motor neurosis** of the stomach in a 19-year-old boy. After severe physical strain attacks began in which there was violent eructation, with rapid decrease in flesh and strength. The abdomen projected in a balloon-like form in its lower part; the tumor moving with respiration, and upon percussion proving to be the distended stomach. There was neither stenosis of the stomach nor atony; the condition was purely hysteria, and the distention due to swallowed air. In discussion, Oser and Singer mentioned very similar cases due to the same cause. [We have seen a case of the same sort in a young boy. The stomach was greatly distended and the respirations were labored.]

Wharton Sinkler³ discussed **rumination** in man. There have been 13 cases reported in American literature, and Sinkler adds 3 of his own. The condition, he states, is one of regurgitation of food after it has been swallowed, without nausea, retching, or disgust. Sometimes the food regurgitated is ejected; in other cases it is remasticated and may be swallowed. The disease is usually due to some reflex nervous action, dependent upon neurasthenia or hysteria, but it occurs in rare instances in healthy persons. Heredity is a feature of some importance in the causation. In the treatment he recommends attention to the general health, and lavage, if there is indigestion, and he suggests the possible value of hypnotism in some cases.

A. Holliday⁴ has, himself, the power of regurgitation of food at will. Examination of his stomach-contents showed normal HCl; the ferments were active, and motility was likewise about normal. After swallowing water in the early morning and regurgitating it he found that it always contained hydrochloric acid. These results vary from those of some other investigators, who have found the secretions reduced in rumination.

Treatment of Chronic Gastric Disease.—W. J. Greig⁵ presents the report of a case with **rupture of a fatty heart**, which occurred while he was **passing a soft-rubber stomach-tube**, the patient falling dead without any premonitory symptoms.

H. A. Hare⁶ has given capsules containing **potassium iodid** alone, and others containing this drug with a small dose of capsicum to the same individuals, and has found that after the capsules containing capsicum the iodid appeared in the saliva much sooner, owing, he thinks, to the stimulation of the gastric mucous membrane causing more rapid absorption. He advises the use of stimulants to the mucous membrane, with other drugs to hasten their absorption. [We have frequently used this plan in the treatment of cases of

¹ Sem. méd., p. 467, 1897.

² Jour. Am. Med. Assoc., Apr. 9, 1898.

³ Canad. Pract., Feb., 1898.

⁴ Wien. med. Woch., p. 26, Jan. 1, 1898.

⁵ Med. Rec., July 10, 1897.

⁶ Therap. Gaz., No. 11, 1897.

chronic alcoholism. In such cases the addition of capsicum to sedative preparations seems to hasten the absorption of the latter.]

L. H. Watson¹ has used **carbon dioxid** as a therapeutic measure in a number of forms of gastric disturbance, having the patient swallow the gas into an empty stomach. It seems to be valuable in nausea and vomiting, being somewhat stimulating and anesthetic, and, he believes, germicidal. He considers it especially valuable in atony, and records 3 cases that showed distinct improvement.

C. L. Greene² suggests the use of a specially constructed **intubation-tube for the control of pernicious vomiting**. This suggestion is based upon the fact that the final mechanism in vomiting is closure of the glottis after forced inspiration, thus providing fixation of the diaphragm and a rigid surface against which the stomach-contents are forced by the abdominal muscles, resulting in expulsion of the contents of the stomach. With an open intubation-tube in the larynx this could not be done. If intubation should fail, Greene would suggest the use of tracheotomy,—of course, only in the gravest cases. He mentions the case of a woman who was unable to vomit while wearing a tracheal tube, and also some work which Wilcox has done on dogs, which shows that they are unable to vomit when wearing a tracheotomy-tube.

Lefour³ has cured a case of incoercible vomiting of pregnancy by spraying **methyl chlorid** on the upper dorsal portion of the vertebral column.

James Taylor⁴ does not believe that all starchy products should be eliminated from the **diet** of cases suffering from amylaceous dyspepsia, since the patients then usually lose weight, and a purely albuminous diet is too irksome. He prescribes a diet of moderately starchy food, and, with it, a diastatic ferment, preferably taka-diastase. It is highly important that the starchy food given should be well cooked and thoroughly masticated.

A. Mathieu⁵ believes with Hayem that the use of large doses of the **alkalies** does not cure hyperchlorhydria, but he considers that one is not justified in stating that the abuse of the alkalies is the cause of this condition. It is only permissible to state that their frequent use in large doses does not modify the production of gastric juice in such cases; but they have the advantage of relieving the pain. He believes that their use is entirely proper, but should be watched.

Montagnon⁶ has found that the use of **warm water** is valuable in certain forms of gastritis, and particularly in those forms in which there are retention and hyperchlorhydria. In his experience, after prolonged use of warm water the motor and sensory functions approach the normal, and if treatment is persisted in long enough recovery will occur.

Soupaault⁷ after using **sodium chlorate** in affections of the stomach, states that in doses larger than 2 drams daily it usually caused albuminuria. He could see no good effect upon the pains of cancer, but it was very useful in hyperchlorhydria, especially in the paroxysmal crises. In subacidity no good effect was observed, and he decides that its only effect is in diminishing the secretion of gastric juice.

W. Wingrave⁸ investigated various **amylolytic ferments**, and comes to the conclusion that taka-diastase seems to be the most powerful, reliable, and rapid in its action. The action of the starch-reducing ferments is retarded,

¹ N. Y. Med. Jour., Jan. 15, 1898.

² Gaz. hebdom. de Méd. et de Chir., Mar. 3, 1898.

³ Soc. mé. des Hôp., Apr. 22, 1898.

⁴ Gaz. hebdom. de Méd. et de Chir., June 30, 1898.

⁵ Brit. Med. Jour., Oct. 16, 1897.

⁶ Lancet, Aug. 7, 1897.

⁷ La Loire Méd.

⁸ Lancet, May 7, 1898.

but not permanently paralyzed, by the organic acids most commonly present in the stomach, and taka-diastase is less influenced by them than is any other ferment. Mineral acids soon stop the action of these starch-ferments. Neither taka-diastase, malt-diastase, nor ptyalin has any action upon cellulose.

F. Kölbl¹ has used **orexin** in a number of general diseases, such as chlorosis and neurasthenia, with the result that the appetite was much improved in about 85 % of the cases. Good results follow, in his experience, in more than half of the cases of chronic gastritis in which there is no active inflammation.

Fremont² reported a number of cases, the subjects of subacidity of the gastric juice and dilatation of the stomach, which he had treated with success by the administration of **natural gastric juice**, which was obtained from a dog, and was given in doses of 5 to 15 oz. in 24 hours. The appetite improved, pains disappeared, and the patients increased in weight. The results in hyperchlorhydria and in cancer were distinctly less favorable.

B. Reed³ has repeatedly noticed that **abdominal massage** will result in a return of the normal condition of the stomach-contents when there had previously been subacidity. He has had the best results by having massage carried out in the direction opposite to that advised by Penzoldt. He considers massage contraindicated in cases of hyperacidity, ulcer, or carcinoma.

R. Riegner⁴ has **investigated the value** of various substances as **gastric and intestinal antiseptics**. Of these, he found that sodium salicylate, menthol, and thymol were the best of gastric antiseptics when used in strengths of from 0.5 % to 2 %. Chinisol, chloral hydrate, silver, and ichthyol were of some value in preventing fermentation in the stomach; while chinisol and thymol seemed completely to prevent intestinal fermentation. A less, though valuable, effect was produced by actol, soluble silver, and menthol. Menthol seems to be the best of all for combined purposes, as it is but slightly irritating and is not readily soluble. The use of sodium salicylate in nutritive enemata prevents the acid fermentation which is so apt to occur in such cases. For lavage of the stomach he recommends sodium salicylate.

Marshall⁵ records a case in which a salol **calculus** was formed in the stomach. Several other cases of the formation of such calculi in the gastrointestinal tract have been reported. In this instance, after taking salol for about 6 months, the patient had a severe attack of colic, with vomiting, and there was expelled from the stomach a calculus which was composed solely of salol. The stone weighed about 1 gm. The patient said that she had previously passed similar masses from the bowel.

M. Einhorn⁶ advises the more frequent use of **intra-gastric electrization**. Of 118 cases which he has treated in this way, the vast majority were either cured or greatly improved. In only 5 was there but slight improvement, while 2 alone were unimproved. Sometimes the gastric contents showed some change for the worse, but in most cases the condition of the stomach-contents improved with the improvement in the patient's general condition. In other cases the condition of the gastric juice did not change at all. Einhorn believes that patients should take rather more than the necessary quantity of food while on this treatment, and he himself gives a liberal diet. The current should never be used so strong as to cause pain, and the strength should be increased only gradually. [The question as to how much good is done by electricity remains unsettled.]

¹ Wien. med. Woch., Dec. 25, 1897.

³ Internat. Med. Jour., Jan., 1898.

⁵ Brit. Med. Jour.

² Gaz. hebdom. de Méd. et de Chir., May 5, 1898.

⁴ Deutsch. med. Woch., June 28, 1898.

⁶ Med. News, June 18, 1898.

R. Neuman¹ has made determinations of his metabolism while he was taking **nutrose and somatose**. While the latter was added to his diet he found that he lost nitrogen for a time, and had intestinal irritation and diarrhea. But he has found that the clinical results from somatose are good, and thinks that the experimental investigation of it does not show all of its value. While using nutrose his estimations showed almost complete nitrogen-equilibrium, and there was no increase of nitrogen in the feces. No digestive disturbance was caused, and he considers the preparation a good substitute for native albumin.

F. Maassen² has used **somatose** in a number of cases in which careful nourishment was necessary, and has found in almost all instances that it increased the appetite, gave better color and greater strength, and caused the hemoglobin to increase, in 1 case as much as 35% in a month.

G. N. Vis and G. Treupel³ have investigated the nutritive value of **sanatogen** by metabolic experiments, and find that it is well absorbed and causes no unpleasant symptoms. It has also a pleasant taste and is readily soluble. The preparation is the glycerin phosphate of sodium casein.

H. Weiss⁴ has used **eucasin**, which is an ammonium compound of casein, in 79 cases which required careful feeding, and has found that it is well borne in all cases and caused marked improvement in weight and general condition. He recommends it beyond all other albuminous food-preparations, particularly in chronic gastrointestinal catarrh, and in various anemias and in tuberculosis. Its taste can be rendered very pleasant by proper preparations. He again⁵ recommends eucasin because of its ready absorption, the lack of irritation from its use, and its distinct nutritive value. It may be used either by the mouth or by rectal administration. He particularly notes that it contains no nuclein, and therefore does not increase elimination of uric acid. L. A. Goldmann⁶ has used eucasin in 64 further cases since his previous report, and has in all cases had good results.

C. A. Ewald⁷ discusses the **propriety of allowing drink with meals**. He notes the fact that people take without difficulty large quantities of water in soups and vegetables during meals, and that most persons feel the necessity for taking fluid at these times. If the drink be lessened the amount eaten will be less, and the appetite may sometimes be excited by a drink of water. Gastric juice is secreted in a quantity somewhat proportionate to the amount of fluid which is taken into the stomach, so that a large amount of fluid may, in this way, be a tax upon the gastric glands; but normal stomachs can accommodate themselves to a considerable range of fluid, and in normal individuals there is never much stagnation in the stomach. Alcoholic fluids, in moderate quantities, do not delay digestion, and may stimulate in many cases, so that it would seem that in normal stomachs drinking at meals within reasonable limits does not interfere with digestion, and may even aid it; but with disease of the stomach the drink should be limited, and if there is dilatation, should be prohibited as far as possible, though absolute interdiction of drink is only to be advised with severe dilatation. The evil influence of drinking with meals has been very much overestimated. In a considerable number of cases fluids have useful effects.

L. Aldor⁸ has been in the habit of using very **large amounts of milk for rectal alimentation**, and finds that as much as 1 liter may be used

¹ Münch. med. Woch., Jan. 18 and 25, 1898.

³ Münch. med. Woch., Mar. 1, 1898.

⁵ Therap. Woch., No. 51, 1897.

⁷ Zeit. f. Krankenpflege, Jan., 1898.

² Wien. med. Woch., Jan. 1, 1898.

⁴ Wien. klin. Woch., Dec. 30, 1897.

⁶ Wien. med. Woch., Mar. 19, 1898.

⁸ Centralbl. f. innere Med., Jan. 29, 1898.

without any resulting discomfort and without its being soon expelled from the bowel, if such enemata be preceded by washing out the bowel at least an hour previously with large quantities of water. Coagulation of milk in the large bowel is, he believes, due to bacterial action, but using alkaline milk and washing the bowel will prevent it. Metabolism-experiments with a patient taking large quantities of milk by rectum showed that practically all of the milk was absorbed during one period, though in another period but small quantities were absorbed.

Du Mesnil de Rochemont¹ records some observations on the clinical results and the condition of metabolism when **subcutaneous nourishment with olive oil** was instituted. He has made more than 500 injections in 28 patients, with never any unfavorable results; the oil being always carefully sterilized and injected with an instrument which could be fully sterilized, and which was very much like the pressure-pump of Valvassori. The injections should be made very slowly and while using very low pressure, in order to prevent pain. The amount used in his work varied from 5 c.c. up to 150 c.c. The conclusions from the metabolism-work were that the fat was absorbed and was made use of in the body-economy; it was not excreted by the urine; and it seems to have prevented loss of nitrogen. He considers that the subcutaneous administration of fat is entirely rational when there is great loss of body-fat. He gives the histories of a number of patients with various conditions (diabetes, severe diarrhea, profound emaciation, typhoid fever, etc.) who were much improved and whose weight increased very considerably by this method of nourishment. In the bodies of those who died in spite of the treatment, he found that the oil had been practically entirely absorbed from the place of injection. [We have found oil administered as enemata absorbed in considerable quantity in several cases.] Fornace and Micheli² have used hypodermic injections of 50 c.c. of olive oil in 5 cases, with the result that the elimination of nitrogen became less, the weight increased, and the general condition improved. None of the oil was excreted in the urine or feces, and there were no fat-embolisms; and the authors believe that these hypodermic injections are better than enemata. They were well borne in all cases.

Gastric Ulcer.—Du Mesnil de Rochemont³ has investigated the condition of the blood and of the gastric juice in a case of **gastric ulcer** and in one of **chlorosis**, in the endeavor to determine any relation that may exist between the two diseases. In both he found the alkalinity of the blood reduced, and the condition of the corpuscles and hemoglobin was similar in the two. The HCl in the gastric juice was increased in both, and therefore chlorosis seemed to predispose to gastric ulcer, but is not sufficient to cause ulcer, as even injury to the mucous membrane of the stomach during chlorosis will not cause an ulcer to develop. The author is inclined to believe that there is some angioneurotic change similar to that acting in perforating ulcer of the foot. Such vascular changes in the skin are quite frequent in chlorosis.

Krokiewicz⁴ records a case of **triple ulcer** of the stomach. Malignant growth had been suspected, owing to the disappearance of a previous hyperacidity and obstruction at the cardiac orifice, but at the autopsy an ulcer of the esophagus was found, which had caused the obstruction at the cardia; and two other ulcers, one of the lesser curvature near the pylorus and one at the pylorus, were present. In 2763 autopsies which he carried out in East Galicia he found round ulcer but 6 times, while he discovered 59 instances of

¹ Deutsch. Arch. f. klin. Med., Apr. 7, 1898.

² Münch. med. Woch., Dec. 21, 1897.

³ Riforma Med., July 14 and 15, 1897.

⁴ Wien. klin. Woch., Dec. 23, 1897.

gastric cancer. He thinks that this variation from the usual statistics was due to the difference in the manner of life in this people.

Fenwick¹ describes a case in which there was **perforation** of a gastric ulcer **into the pericardium**. The patient, a man of 55 years, was taken while in good health with sudden pains and cardiac palpitation, and quickly died. Food was found in the pericardium when an autopsy was undertaken, and a small passage-way led from the pericardium into the stomach through the base of a chronic ulcer. [Cases of the same sort have been reported by others.] Rosenthal² records a case of gastric ulcer which had been progressing satisfactorily under the use of nutrient enemata, when suddenly marked dyspnea and cyanosis appeared, and death occurred soon after. The autopsy showed that the cause of death was **pulmonary embolism**.

Cade³ records a case of **perforating ulcer** of the stomach in an **infant** 2 months old. There had been vomiting and diarrhea, which had caused death; and at the autopsy the posterior peritoneal cavity was found closed by inflammatory adhesions and contained a greenish, acid fluid. On the posterior wall of the stomach, situated high up and near the pylorus, there was a single round ulcer as large as a ten-cent piece, which connected with the cavity behind the stomach. C. M. Hibbard⁴ reports the case of a child, 4 months old, in whom severe gastric symptoms ensued upon diphtheria, and the child died of exhaustion. There was no vomiting of blood. The postmortem showed a circular area, 5 cm. in diameter, which was partially outlined on either side by deep losses of substance, the largest of these being 3 by 5 cm. in size. The ulceration extended, in places, through to the muscular coat. There was some fibrin in the tissue, and hyaline thrombi were present in the blood-vessels, suggesting that the ulcer might have been due to diphtherial necrosis, so that the case is not positively one of simple gastric ulcer. Eleanor C. Jones⁵ reports a case of gastric ulcer which occurred in a man 84 years of age. There was a preceding history of gastric ulcer about 30 years before his death, and at the postmortem a fresh ulcer and an old scar were found.

Giraudeau⁶ records a case of **infectious hematemesis** in a woman of 43. The attack began with chills and vomiting of a large amount of blood. This was repeated 2 days afterward, and again on the seventh day. The temperature was very irregular. There was no Widal reaction. A mitral murmur appeared, and the *Staphylococcus aureus* and *citreus* were found in the blood. There was afterward a phlegmasia. The author notes another case of infectious hematemesis in a man of 45, which was due to a suppurating inguinal bubo. Small clots of blood were found in the vomit every day, and disappeared only after the bubo was opened. Sometimes this form of hematemesis may necessitate operation to stop the hemorrhage.

Treatment.—E. Wynter⁷ divides gastric ulcer into three different clinical forms. The first occurs in anemic young women, is preceded by symptoms of dyspepsia, and is associated with one or more attacks of hematemesis, but is rarely fatal. This is the most common of all, and is probably due to a superficial erosion of the mucous membrane. The next most common type is the chronic ulcer, which lasts over a considerable period, causing the usual symptoms. The situation of the ulcer may often be determined by noting the position the patient assumes, since he endeavors to get the ulcer above the level of the contents of the stomach. The third class is that in which sudden

¹ Lancet, Aug. 14, 1897.

² Hospital-tidende, June 22, 1898.

³ Rev. internat. de Méd. et de Chir., vol. viii. No. 22.

⁴ Boston M. and S. Jour., Aug. 19, 1897.

⁵ Med. News, Oct., 1897.

⁶ Jour. des Prat., Feb. 2, 1898.

⁷ Treatment, Dec. 23, 1897.

perforation occurs without any notable preliminary symptoms and requires immediate operation. Of 3 such cases which he has had operated upon recently, 2 died. In the first fatal case the opening could not be found, and in the second it was so high up that it could not be reached.

Dieulafoy¹ records 7 cases, 2 of them in his own practice, in which extremely grave hematemesis was due to **superficial erosion** of the mucosa of the stomach. He draws attention to the necessity for suspecting this condition in such cases, and for early operation in the very grave cases. It is important to note that the stomach must often be examined with minute care, sometimes with a lens, to discover the source of the hemorrhage. Operation is more successful in this condition than in simple ulcer, owing to the lesser extent of the lesion.

W. Murrell² uses **iodin** in 5-drop doses, 3 times daily, in treating gastric ulcer. He claims rapid improvement under this treatment, and thinks it is due to the antiseptic and stimulating effect of the iodine upon old and indolent ulcers.

W. Winternitz³ uses **hydrotherapy** in the treatment of gastric ulcer, since he says it quiets the irritation of the nerves, causes an increase of blood-supply to the stomach, and increases the alkalinity of the blood, thus decreasing the hyperacidity of the stomach-contents. The proofs of the correctness of his view will, he says, be published in the future.

St. G. Reid⁴ had 2 cases of hematemesis of extreme gravity, which he treated by administering **iron perchlorid** in doses of 10 to 15 minims every hour. Both patients soon improved and recovered completely.

J. B. Walker⁵ has had useful results in treating **hematemesis with turpentine**, mixing the drug drop by drop with sweet-anise water, just before its administration, in order to mask the nauseous taste. In various other hemorrhagic conditions he found this drug useful.

C. O'Donovan⁶ insists upon the advisability of **operation in gastric ulcer** when there are constant and dangerous recurrences of severe symptoms, particularly when hemorrhage occurs repeatedly.

Dieulafoy⁷ records a highly interesting case in which a diagnosis of **syphilitic ulceration of the stomach** seems to have been made upon very firm ground. The subject of the disease was a man of 33, who had had for years very severe symptoms of gastric ulcer, chiefly consisting of violent and persistent vomiting, and an attack of severe hematemesis. Because of the persistence of the trouble in spite of even the most careful treatment, and because of the history of previous specific infection, Dieulafoy was led to suspect a syphilitic ulceration, and administered hypodermic injections of bichlorid, with the result that within a few days the symptoms began to disappear and recovery ensued with great rapidity. He has found notes of such cases by a few other authors, the earliest one dating back to the writings of Andral, who made this diagnosis and cured the patient with anti-syphilitic treatment. There are 3 additional cases on record, and Dieulafoy insists that it is probable that syphilis of the stomach is more common than is usually supposed, and may present itself in many forms, such as erosions, gummatous infiltrations, or circumscribed gummata, or finally ulcerations. It may present all the symptoms of simple ulcer, and there is nothing in the symptoms distinctive of syphilitic disease. The diagnosis should be suggested by a history

¹ Bull. de l'Acad. de Méd., No. 3, 1898.

² Med. Brief, May, 1898.

³ Wien. med. Woch., May, 1898.

⁴ Brit. Med. Jour., Feb. 26, 1898.

⁵ Therap. Gaz., July 15, 1897.

⁶ N. Y. Med. Jour., July 10, 1897.

⁷ Bull. de l'Acad. de Méd., May 17, 1898.

of syphilis and by the persistence of the symptoms in spite of conscientious treatment.

Changes in Form and Position.—C. A. Meltzing¹ does not believe that there exists normally any tension-pressure from the abdominal walls upon the contents of the abdomen. He has investigated the question in cadavers, and finds that the hydrostatic pressure is equal in cm. to the distance that the measured point is removed from the highest portion of the abdominal cavity, and therefore concludes that the pressure is not due to the abdominal walls, but to the hydrostatic pressure of the contents. In normal positions, in experiments upon himself, there was no negative pressure; but there was negative pressure when he assumed the knee-elbow or the inverted position. He believes there are two distinct varieties of enteroptosis. The first, which he calls pure enteroptosis results from overstretching of the abdominal walls, which forces the ligaments into play and causes them to be over-stretched from the falling of the organs. In this case a negative pressure results in the upper abdomen, and for its equalization the diaphragm must descend, and the blood-vessels and lymphatics in this region become overdistended. From this there results disturbances of the heart-action, of the sympathetic nerves, and of the circulation. The other form of enteroptosis is due primarily to distortion of the abdominal organs from compression, chiefly from tight lacing. But tight lacing does not always cause enteroptosis. It may cause forward pressure upon the abdominal walls, but a general ptosis does not result unless the abdominal muscles are weak and give way, when there is produced a combination of the pure enteroptosis and of enteroptosis from distortion. In the latter form, if the abdominal walls are good there is no change in the size of the abdominal cavity, but the muscles give way only sufficiently to compensate for the downward pressure of the diaphragm; or the force is directed upward, so that the normal size of the abdominal cavity is retained at the expense of the thoracic cavity. This is not really an enteroptosis, and general symptoms do not usually result until there is weakness of the abdominal walls and downward displacement of the organs.

Langerhans,² in discussing **gastroptosis**, states that he distends the stomach by attaching a condom to the end of a stomach-tube, and after introducing this distends the condom by pumping in air. In this way he believes he obtains a better idea of the size and position of the stomach than by any other method. He considers gastroptosis due to various causes, of which the most important are relaxation of the abdominal muscles following repeated pregnancies, and chlorosis; the condition in the latter case not being due to the displacement of the digestive organs, as Meinert claims, but causing their displacement by the weakness of the muscles, the distention of the stomach, and the retention of its contents which occur in this disease. Langerhans also believes that nervous dyspepsia may lead to gastroptosis in somewhat the same way as chlorosis, and thinks that there is at times an hereditary tendency to gastroptosis. He does not believe in the existence of a negative intra-abdominal pressure. Abdominal bandages are of use only in the treatment of the postpuerperal form. He especially recommends gymnastic exercises and careful treatment of the nervous system. M. Bial³ finds that after application of binders in cases of gastroptosis the stomach is not elevated in the least. He is inclined to attribute the effect of binders to suggestion, and believes that the effects of gastroptosis itself are practically *nil*, but refers all the symptoms to the general neurotic character of most of these patients. He records 2 cases in which

¹ Arch. f. Verdauungskrankh., Band iv., Heft 2.

² Ibid., Band iii., Heft 3.

³ Berlin. klin. Woch., July 19, 1897.

suggestion alone relieved the symptoms. [The view expressed by the author is certainly erroneous as far as a large proportion of the cases are concerned. In our experience it has seemed that the displacement of the stomach in itself occasioned nervous and other symptoms.]

C. G. Stockton¹ has seen such useful results following **nephrorrhaphy** in cases of enteroptosis, that he advises this operation in all cases in which the symptoms are aggravated. He has observed enteroptosis in two male children under 10 years of age, many times in young unmarried women who have led lives of leisure, and in a large proportion of all females who had symptoms apparently arising from indigestion, constipation, and anemia.

Cheyne² describes a case of **hour-glass contraction** of the stomach in which the diagnosis was based upon the absence of marked dilatation and upon the fact that fluid could be heard bubbling, as if passing through a narrow orifice, in a situation about the center of the stomach. The Heineke-Mikulicz method of operation was adopted, and the result was extremely successful.

J. Ferguson³ records an interesting case of **diverticulum** of the stomach. Death had occurred from hernia, and near the cardiac end of the stomach was found a pouch as large as an egg, which communicated with the stomach by an opening about the size of one's finger. It contained no foreign body, and its walls were formed by the mucous membrane, the submucosa, the serous coat, and the muscularis mucosae, while the muscular coat ended just at the opening into the stomach. It was therefore thought to be a pulsion-diverticulum, which probably began by protrusion alongside the blood-vessels where the muscular coat was weak.

Sir William H. Broadbent⁴ contributes an article on **dilatation of the stomach**, containing a number of interesting points, besides a review of the clinical features of this condition. In the discussion of the etiology he refers to 2 cases of apparently **acute dilatation**. In the first case, a woman of 35, not robust, but enjoying good health, took an ice on an empty stomach about 5 P. M. on a hot July afternoon in 1895, when fatigued from shopping. She was well until the following evening, when she was seized with violent pain in the epigastrium, attended with tetany involving the hands and wrists, especially the left, and also the feet. After taking considerable brandy she vomited, and lost consciousness. For 6 days she took nothing but small quantities of milk, and after that minced chicken. She then had another outbreak of tetany, which was not so severe as the first. The author believes that the ice paralyzed both the secretory functions and muscular walls of the stomach and the food accumulated and fermented. During 2 years following this she was ill at intervals, losing in weight, suffering frequent pain in the epigastrium, which radiated through to the left scapular region, and at times down the left arm. She also had palpitations and suggestions of tetany. In the second case, a man of 50 crossed from Newhaven to Dieppe, eating a hearty meal on board the steamer. On the journey from Dieppe to Rouen he became faint and vomited copiously until he was got to bed. In both these cases the stomach was greatly dilated. In speaking of the symptoms of dilatation of the stomach in general, the author refers to one that is not, as a rule, discussed—viz., **anginoid pain**. This, when of gastric origin, is always due to dilatation, or at any rate to distention, and seems to result from mechanical embarrassment of the heart. A characteristic which distinguishes such cases from cardiac angina is the history that the early attacks at least were unassociated with exercise or excitement. Referring to **vertigo** as one of the

¹ Buffalo Med. Jour., July, 1897.

³ Glasgow Med. Jour., Mar., 1898.

² Lancet, Mar. 19, 1898.

⁴ Practitioner, Jan., 1898.

symptoms, the author points out distinctions from Mérière's disease. There is not a sudden onset or the apparent translation, horizontal or vertical, of external objects which characterizes auditory vertigo, and the patient rarely falls, though he often seizes some support. In discussing the diagnosis of dilatation the author refers particularly to percussion and auscultation. He lays some stress on the splashing-sounds elicited by pressure. [The author does not consider inflation of the stomach among the methods of examination. In our experience there is no method comparable with this. Splashing-sounds we regard as very unsatisfactory.]

C. R. Box and C. S. Wallace¹ describe a case of **acute dilatation** of the stomach which occurred in a boy, 16 years of age, after a blow on the epigastrium. The abdomen became distended, rigid, and motionless. There were pain and tenderness in the region of the appendix, and owing to the suspicion of an appendicitis the abdomen was explored. An enormously distended stomach was found. It was incised and emptied, but death followed. No local cause was found postmortem, but the walls of the stomach were in a condition of rapid postmortem digestion. Parkes Weber, in discussion, recalled a case in which acute dilatation of the stomach occurred with pneumonia during the febrile stage, and the condition was thought to be intestinal obstruction. The patient died in collapse. Fenger and Hessert² record a case of acute dilatation of the stomach which occurred after the operation of cholecystotomy. The operation was undertaken for a gall-stone, which was removed. After the operation there was a good deal of gastric distress, with vomiting and some pain, for 3 days. On the fifth day there was sudden complaint of pain in the abdomen, a little below the umbilicus. The pulse became rapid, and there was a rise of temperature, with haggard features. Occasionally hicough and frequent projectile vomiting of greenish fluid occurred. In the upper two-thirds of the left half of the abdomen there was a soft, elastic swelling which was tympanitic on percussion. Lavage greatly relieved all these symptoms and removed a large quantity of greenish fluid, but the patient lost strength, and died 10 days after the operation. Upon postmortem examination the stomach was found enormously dilated. In the diagnosis of acute dilatation of the stomach the presence of a debilitating causal factor, vomiting of a large quantity of greenish fluid, and the distention in the upper left-hand portion of the abdomen, with a general condition resembling that in peritonitis or intestinal obstruction, are points of great importance. Lavage will often aid the diagnosis by discovering a large amount of gastric contents, and will frequently relieve the patient.

Viere³ observed loud, **troublesome borborygmi** with each respiratory movement in a girl of 15 years. These noises came on even after taking water into her stomach. The child had dilatation and ptosis of the stomach; after application of Glénard's belt the borborygmus ceased.

M. A. Boid,⁴ in discussing gastric dilatation, mentions a case in which severe attacks of **spasmodic asthma** occurred in association with dilatation of a severe grade. These attacks always came on after a great deal of stagnation had occurred, and were relieved by lavage. Boid believes that they were due to some toxic substance absorbed from the stomach.

W. Carr⁵ records the case of a man, 28 years of age, who had for some years had severe gastric disturbance, when symptoms of **peripheral neuritis** came on, growing so severe that he walked but very feebly. The stomach

¹ Lancet, June 4, 1898.

³ Gaz. des Hôp., Aug. 3, 1897.

² Clinical Rev., Feb., 1898.

⁴ Brit. Med. Jour., July 31, 1897.

⁵ Lancet, Sept., 1897.

was considerably dilated, and after lavage the peripheral neuritis improved rapidly. Carr is inclined to attribute the neuritis to the absorption of products of fermentation from the dilated stomach.

R. B. Preble¹ records the case of a Pole, 32 years old, who had dilatation of the stomach and showed a spasmodic muscular condition resembling **tetany**, but the Chvostek and Trousseau signs were both absent, and the fingers, instead of being extended in the distal joints, were flexed. There was also in this case a condition which resembled **pulmonary osteoarthropathy**. The distal phalanges were enlarged and the bones were relatively transparent. If this be considered a case of osteoarthropathy, it is the first which has occurred with gastrectasia, and would seem to be due to poisoning from the decomposing gastric contents.

T. Jürgensen² records the case of a man, 43 years of age, who had a greatly **dilated stomach from stricture of the duodenum**, and who died after the appearance of some stupor, which rapidly increased, and within 24 hours resulted in complete coma. There were during this time clonic convulsions, which became severely epileptiform. The heart became weak, the breathing irregular, the pupils did not react, and there was uncontrollable vomiting. Jürgensen believes that this was uremia, and not, as some authors would be very much inclined to state, an intoxication from the dilated stomach, and he is supported in this by the fact that during this time there was almost complete anuria.

Max Einhorn³ prefers the term **ischochymia** to dilatation of the stomach, because the stagnation of food is the essential symptom and may be present without any signs of dilatation, and enlarged stomach may be present without actual dilatation. He presents a study of cases, which are divided into, first, those submitted to operation, including cases of benign and malignant stenosis of the pylorus; and, second, cases treated by palliative methods. Of the benign cases of the first class, 4 did very well and 2 died; while of malignant cases operated upon he mentions 2 who were markedly relieved by gastroenterostomy. His concluding advice is, that if the ischochymia be due to a far-advanced benign stenosis, or to a commencing malignant stenosis, operation is indicated. In beginning benign stenosis or in relaxation of the muscular coat palliative treatment should be given a trial. In the vast majority of cases of interference with the transportation of chyme from the stomach into the intestine a narrowing of the pylorus exists. [We cannot regard the name suggested a desirable addition. There have been too many additions to nomenclature and too few attempts to simplify knowledge and classifications in gastric disease.]

N. Reichmann⁴ directs attention to the fact that a **temporary stenosis** of the pylorus may be **caused by biliary colic**. The reason of this is uncertain, but it is most probable that the gall-bladder, swollen and distended with stones, causes pressure upon the pylorus or upper part of the duodenum, and that this is subsequently relieved, or that the attack is due to irritation of the solar plexus, with resulting spasm. The condition may sometimes become permanent. (See also Graham on Cholelithiasis.)

J. Boas⁵ reports 3 cases of hypertrophic stenosis of the pylorus, or, as he prefers to call it, **stenosing gastritis**, since he believes it is the result of a chronic gastritis. The distinctive points in the symptomatology are, that it usually occurs before middle age; is very chronic in its progress, digestive

¹ Medicine, July, 1898.

² Deutsch. f. klin. Med., June 16, 1898.

³ Med. Rec., July 19, 1897.

⁴ Berlin. klin. Woch., Aug. 16, 1897.

⁵ Arch. f. Verdauungskrankh., Band iv., Heft 1.

disturbances of a form common to other affections usually preceding for some years; subsequent to which persistent vomiting appears when compensation is disturbed; the general health then fails, the patient loses weight, and there are constipation and decrease of the urine—symptoms of gastrectasia. It is, however, noted that the appetite is usually retained; that there is no history of blood in the stomach; and that the stomach is not greatly enlarged. Visible peristalsis was seen in 1 case. The motility is so disturbed that solid food always stagnates somewhat, while fluids usually pass the pylorus. HCl is always absent, and the ferments greatly decreased or absent. Lactic acid was present in all cases; sarcine were absent. The diagnosis depends upon signs of stenosis with those of severe gastritis, and the condition is separated from the stenosis consecutive to ulcer by the absence of a history of blood and the absence of HCl. Atonic ectasy never shows visible peristalsis, and in Boas's experience symptoms of such severe gastritis, as occur in the affection he describes, are absent with atony. The diagnosis of carcinoma may be difficult, but is chiefly based upon the earlier age of the patients and the chronicity and variability of the course. The motor function, too, fails progressively in carcinoma. The presence of a small tumor at the pylorus is not distinctive of carcinoma. The prognosis is unfavorable unless operation is undertaken. All Boas's cases had gastroenterostomy performed. Two recovered and 1 was much improved. If fluids cannot be taken without stagnation, operation is absolutely necessary. In other cases it depends upon circumstances, and, if operation is not undertaken, treatment is chiefly careful diet, largely composed of fluids, the use of digestive ferments, and hygienic measures.

Doyen¹ states that he has performed nearly 100 operations on cases of pyloric obstruction, of which 61 were noncancerous, and in 46 of these the stenosis was due to a **spastic contracture from reflex irritation**, without cicatricial contraction about the pylorus. The pylorus was excised in many cases; its orifice was found to be but 10 mm. or less in diameter, and scarring about the pylorus was absent in all the 46 cases mentioned.

Carle and Fantino² published the results of **operation** upon 41 cases of **stagnation of food** in the stomach, of which the cause was nonmalignant disease. Nine of these cases seemed to be due entirely to spasm, for there was always retention of food; but atony was absent, and there was no obstruction found, while the walls were hypertrophied. Such cases caused Robin to believe that excessive secretion of HCl is the cause, but the further results of the present authors show that this is an improbable theory, since, of the 41 cases operated upon, 20 had hypersecretion of HCl; and of 18 of these 20 who were accurately examined, 17 were entirely cured of their hyperchlorhydria after the obstruction was relieved, and in 1 other case, in which the obstruction was not relieved by operation, the hypersecretion remained. Therefore the hypersecretion seemed to be due to the obstruction, rather than the reverse. They believe that the difference of opinion between Robin and Hayem, the former insisting that the disease is curable without operation, and the latter that it is not, is due to the fact that spasm begins the trouble, but fibrous stricture finally ensues. Robin's observations were chiefly upon early cases, while Hayem's were based upon what he saw postmortem or during operation, when the stricture had followed from long-continued spasm. The authors believe that gastrosuccorhea may occur without pyloric obstruction, but such cases must be rare. The primary stenosis is probably caused in the beginning by reflex irritation from slight lesions which escape observation, such as minute ulcers or fissures. They insist that operation should be undertaken

¹ Méd. mod., No. 43, 1897.

² Sem. méd., July 21, 1897.

more frequently, since the death-rate is low (they have had 20 gastroenterostomies without a death when using Murphy's button), and if operation is not undertaken the outlook is bad. Pyloroplasty should be chosen if there is slight functional or cicatricial obstruction, since regurgitation of bile does not follow it; but if there is atony, or if the pylorus is flexed or there is peripyloritis, gastroenterostomy should be done.

Cecini¹ observed the development of the symptoms of **hyperchlorhydria and hypersecretion of gastric juice** in a type-setter. The symptoms disappeared for a time, but subsequently those of pyloric stenosis developed, necessitating gastroenterostomy. During the second attack there was no excess of hydrochloric acid in the stomach. Cecini believes the affection was a manifestation of **lead-poisoning**.

Rippal and Baylac² investigated the condition of the stomach-contents in an alcoholic patient upon whom a **gastroenterostomy** had been done for stenosis of the pylorus. Previous to this the stomach-contents had been hyperacid and there had been much fermentation. After the operation the pains vanished entirely and free HCl was never found, but some digestion went on in the stomach. The stomach was emptied somewhat more rapidly than normally.

F. Schwyzer³ records a case of **congenital hypertrophy and stenosis of the pylorus**, which caused the death of an infant 6 weeks after birth. There had been no violent symptoms for nearly a month after its birth, but persistent vomiting and constipation, with dilatation of the stomach, then led to a strong suspicion of pyloric obstruction, though the presence of bile in the vomit at one time made this diagnosis seem improbable. After death, however, the pylorus was found so much contracted that it would barely admit a probe $1\frac{1}{2}$ mm. in diameter, and fluids could scarcely pass it. The pylorus was almond-shaped, 26 mm. long and $13\frac{1}{2}$ mm. in diameter. Microscopic examination showed enormous thickening of the muscular layer, and this composed the chief part of the tumor.

Carcinoma of the Stomach.—Etiology and Pathology.—Boas⁴ states that in 62 carcinomata of the gastrointestinal tract which he has observed recently there were 9 in which the symptoms had supervened upon **violent traumatism**. The time that elapsed between the traumatism and the development of the symptoms was from 2 months to 4 years. The author believes that the traumatism lowers the resistance of the organs, and either makes them more liable to the development of carcinoma or excites the growth of one which is already in progress. In one case in which the diagnosis was doubtful previous history of severe traumatism of the stomach led him to advise operation, and by this means a cancer of the pylorus was very recently discovered.

J. C. Hemmeter and D. Ames⁵ record a case in which there were, first, symptoms of gastric ulcer, but progressive cachexia came on, rendering the diagnosis somewhat doubtful. The postmortem showed there was an old ulcer with carcinomatous infiltration about its edges and with purulent infiltration of the stomach-walls in the neighborhood. The authors state that they discovered the Oppler-Boas lactic-acid bacillus in both the stomach-contents and in the tissues surrounding the ulcer.

Diagnosis.—Chiaruttini⁶ concludes from his investigations that lactic acid is found in many cases of diseases of the stomach which are not carci-

¹ *Gaz. degli Osped. e delle Clin.*, Oct. 10, 1897.

² *Bull. méd.*, p. 40, 1898.

³ *N. Y. Med. Jour.*, Nov. 27, 1898.

⁴ *Deutsch. med. Woch.*, No. 44, 1897.

⁵ *Med. Rec.*, Sept. 11, 1897.

⁶ *Gaz. degli Osped. e delle Clin.*, May 26, 1897.

noma, and he believes that lactic acid is of little positive diagnostic importance. But the constant absence of this acid allows one to say that a carcinoma is not present.

V. Jez,¹ in considering the value of **examination of the blood** in diseases of the stomach, has found that in acute gastritis nothing of value can be learned; but from his own examination of 8 cases of cancer and of 3 cases of ulcer, and the study of the literature upon the subject, he has reached the conclusion that in cancer the red cells are very distinctly more reduced than they are in ulcer, while there is practically always a leukocytosis in cancer, which may be due to hemorrhage or to softening of the tumor. Leukocytosis, however, occurs in ulcer as well, probably owing to the hemorrhage. But the points of most serious importance are that nucleated red corpuscles practically never occur in ulcer, while they are usually seen in advanced cancer, though their absence would not make the diagnosis of ulcer certain; and digestive leukocytosis speaks strongly against a carcinoma of the stomach, though its absence does not make the diagnosis of cancer positive. No one of these points is of very great value alone, but considering them altogether he believes that they are great aids in diagnosis.

J. A. Capps² gives the records of 30 cases in which **digestion-leukocytosis** was tested. Seventeen were carcinoma. In 6 of these cases tumor was absent, in 4 hydrochloric acid was present, and in 13 lactic acid was absent, while digestion-leukocytosis occurred but twice, so that in this series absence of leukocytosis was the most reliable of all diagnostic tests. It was absent, however, in 3 of the 5 cases of chronic gastric catarrh which he examined, so that Capps believes that it is a valuable, but by no means an absolute, test. He considers it at least equal to the hydrochloric-acid test. T. L. Chadbourne³ found that digestion-leukocytosis was present in 2 of the 10 cases of gastric carcinoma that he studied, and was absent in 2 out of 3 cases of marked anemia, as well as in 3 of 5 cases of atrophy of the gastric tubules. He therefore reaches the conclusion that the absence of digestion-leukocytosis is not pathognomonic of gastric carcinoma, but thinks it usually absent, and that its absence often assists in diagnosis.

F. P. Henry⁴ thinks there is great diagnostic utility in counting the **red blood-corpuscles** when a diagnosis between cancer of the stomach and pernicious anemia is in doubt, and states that he has never seen gastric cancer with a blood-count below 1,500,000, nor a fatal case of pernicious anemia with a blood-count greater than 1,000,000.

Symptoms.—H. J. Hamilton⁵ records a case of carcinoma of the stomach with **subcutaneous metastases**. There had been dyspeptic complaints, with the presence of a tumor and symptoms suggesting cancer. Numerous nodules of varying size, more plentiful on the trunk than on the limbs, had appeared quite early. It was thought to be a sarcoma, but was found postmortem to be carcinoma, which had involved almost the whole of the stomach. The liver was not affected. He believes that metastasis must have been through the arteries.

H. F. Vickery⁶ records 3 cases of cancer of the stomach in which free **hydrochloric acid** was present, and in all of which the diagnosis was confirmed by postmortem examination. [There is no definite history of preceding ulcer in any of the cases, though it is strongly suggested in one case, and perhaps in a second.]

¹ Wien. med. Woch., Apr. 2, 1898.

² Boston M. and S. Jour., Nov. 4, 1897.

³ Berlin. klin. Woch., June 10, 1898.

⁴ Arch. f. Verdauungskrankh., Band iv., Heft 1.

⁵ Canad. Pract., Jan., 1898.

⁶ Boston M. and S. Jour., Aug. 5, 1897.

G. Liebmann¹ records a case of cancer of the pylorus, which was interesting in the **absence of cachexia and anorexia**, and because of the fact that HCl was constantly present and lactic acid always absent from the stomach-contents.

W. Russel² records an interesting diagnosis of **gastrocolic fistula** due to malignant ulceration of the stomach. The diagnosis was based upon the preliminary symptoms of ulcerative carcinoma of the stomach, and the subsequent occurrence of fecal vomiting without intestinal obstruction, dulness anterior to the spleen, and tenderness over this dulness, the latter indicating adhesions at this point. F. Bec³ gives a careful discussion of gastrocolic fistulæ, based upon a study of the 68 cases that he has found reported. Carcinoma is the most common cause, though ulcers, abscesses, and other conditions may give rise to it. There is sometimes severe pain at the time of perforation, though this is rare, and the characteristic signs are fecal vomiting with lenteric stools, while stools and vomita are of similar constitution. HCl may be found in both the stomach-contents and the stools. The best method of diagnosis is by inflation of the stomach and large intestine with gas. The course of the affection is unfavorable, and leads to rapid emaciation and death in from 4 weeks to 2 years or sometimes longer. If the condition is not due to carcinoma, operation should be undertaken.

Sarcoma of the Stomach.—Hammerschlag⁴ discusses noncarcinomatous malignant tumors of the stomach, which he says have received too little notice. Sarcoma is usually primary and may occur in any part of the organ, but most frequently on the greater curvature. It is apt to occur late in life; and of 30 cases collected 19 occurred in females. The gastric symptoms are usually not pronounced in the beginning, but subsequently resemble those which occur in cancer. HCl was absent in 7 cases, and lactic acid in 5 of these. There was leukocytosis, but no digestion-leukocytosis. The course is usually from 1 to 1½ years. The metastases and their situation are the most important clinical distinctions from cancer. In some cases arsenic seems to have done good. H. Brooks⁵ records a case of sarcoma of the stomach which had developed around an old scar resulting from a bullet-wound received in the Civil War. He thought the sarcoma was possibly the result of the chronic irritation from the wound. The symptoms during life had been pain, loss of appetite, emaciation, and hematemesis.

Benign Tumors of the Stomach.—Hayem⁶ describes 2 cases of what he calls **gastric polyadenoma** of the type of Brünner's glands. This is a growth derived from the culs-de-sac of the glands of the mucosa, but passes through the muscularis mucosa, spreads out in the submucosa, and leads to atrophy of the muscular coat. It therefore evidently resembles carcinoma; but Hayem thinks it is benign, although considering it a connecting link between simple hypertrophies and malignant neoplasms. In his cases gastritis and ulceration were present, and in one a fatal perforation occurred. In the other case, besides the adenoma, which had caused acute pyloric obstruction, there was a latent ulcer which had undergone carcinomatous change. Hayem believes that the adenoma was older than the carcinoma in this instance, and admits the possibility that it had become malignant.

H. B. Anderson⁷ records a case in which there had been during life a tumor in the umbilical region, with disturbance of digestion and increasing

¹ Boston M. and S. Jour., Feb. 17, 1898.

² Gaz. hebdom. de Méd. et de Chir., Jan. 16, 1898.

³ Zeit. f. klin. Med., vol. xxii., Supplement.

⁴ Presse méd., Aug. 4, 1897.

⁵ Scottish M. and S. Jour., Feb., 1898.

⁶ Med. News, May 14, 1898.

⁷ Brit. Med. Jour., Feb. 12, 1898.

weakness. An operation was undertaken and a cyst evacuated, but death occurred. At the postmortem 3 **cysts of the stomach** were found: a large one on both the anterior and posterior surfaces, and a small one at the pyloric end. There was also 2 cysts of the jejunum and a large cyst of the omentum. All of these were partially lined with columnar epithelium and contained cholesterin, needle-like crystals, and columnar and goblet-cells, and seemed therefore to be teratomata.

Tuberculosis of the Stomach.—G. Blumer¹ records a case of multiple tuberculous ulcers of the stomach, which were seen in the body of a woman who had died with the clinical symptoms of typhoid fever, and who had had no stomach-symptoms during life. At the autopsy he found general miliary tuberculosis, which involved nearly all the organs of the body, including the kidneys, the aorta, the ileum, and the stomach. The ulcers in the latter organ were 3 or 4 in number, were circular, 4 to 6 mm. in diameter, and had smooth, clean bases. Microscopically they had the appearance of tuberculosis, and bacilli were discovered. In one instance there was an appearance as if the remains of a gastric tubule were filled with bacilli, which seems to suggest that the stomach may have been infected by ingested bacilli. Of 18 cases reported in which the sex is mentioned, it is of some interest to notice that 14 were males, and among the same number the ulcers in 6 were on the lesser curvature, in 4 they were near the pyloric end, and in 4 were distributed generally. Of 24 cases, there was a single ulcer in 12 and multiple ulceration in 12. Henkel,² in a child of 4 years, dead of tuberculosis, found, beside tuberculosis of the lungs, ulcerations of the intestine and of the posterior wall of the stomach. In the latter there were many bacteria, principally streptococci, and the vessels were filled with bacteria and showed hyaline thrombi. It is possible that the ulceration was caused by infection by streptococci swallowed with the sputum.

DISEASES OF THE INTESTINAL TRACT.

A. Schmidt³ investigated the contents of the **stools from a patient with an artificial anus** at the lower end of the ileum. He found a considerable quantity of muscle-fibers, of connective tissue, and of starch, with small portions of soluble albumins and fat. Leucin and tyrosin were absent, as were bile-acids and mucus. Pepsin and a diastatic ferment were present, but fat-splitting ferments were absent. There was no evidence of decomposition of albuminous food-stuffs, but the presence of aromatic acids indicated fermentation of carbohydrates. The explanation of the sudden beginning of decomposition of albumins immediately after the ileocecal valve is passed is difficult. The presence of fermentation of carbohydrates in the small intestine is not a sufficient explanation, since this does not completely prevent albuminous putrefaction. Probably the most important factor is the stagnation which occurs in the large intestine, the thickening of the intestinal contents being an added factor; and perhaps even more important is the change from an acid reaction to alkaline or neutral, and the opportunity which this gives for the growth of new forms of bacteria. It is evident from his results that some digestion does take place in the large intestine, since the food is only partially digested when it reaches there, and the intestinal contents still contain active ferments. This digestion is, however, but a continuation of what has been already started in the small intestine.

¹ Albany Med. Ann., Mar., 1898.

² Gaz. hebdom. de Méd. et de Chir., Mar. 31, 1898.

³ Arch. f. Verdauungskrankh., Band iv., Heft. 2.

C. A. Herter¹ has made some investigations to determine the **relation of the growth of microorganisms in the intestines to indicanuria**. These seem to show that the introduction of large numbers of the common colon-bacillus markedly increases the amount of indican; the introduction of large numbers of *Proteus vulgaris* may increase the ethereal sulphates without perceptibly increasing the indican; while the lactic-acid bacillus may reduce the indican and ethereal sulphates.

Constipation and Diarrhea.—L. Pincus² directs attention to the importance of weakness or injury of the muscles of the pelvic floor in the causation of constipation. He advises treatment of the abdominal muscles during the puerperal period, if these muscles show any weakness, while the pelvic muscles should likewise receive massage and similar treatment. G. Kobler³ has noticed in a number of cases in which there was severe ordinary constipation, attended with attacks of colic, that albumin, with renal epithelium, casts, and sometimes red and white blood-corpuscles, appeared in the urine, but vanished after the constipation was overcome. He has also noticed casts and albumin in the urine in cases of dysentery.

Max Einhorn⁴ discusses the occurrence of constipation and diarrhea **from diseases of the stomach alone**, without any distinct involvement of the intestines. The conditions in which these disturbances of the bowel are most commonly found are those associated with hyperchlorhydria and achylia. In the latter diarrhea is more common, in the former constipation; but this is not necessarily the case, and the reverse may be true. A number of cases are reported as examples of the point that the author would make, that the affections are dependent solely upon the stomach-trouble. In these cases the relief of the gastric affection gave relief to the bowel-disturbance. [Undoubtedly disturbances of the gastric function frequently occasion secondary disorders of the intestines, with either constipation or diarrhea as consequences.]

Zavatsky⁵ discusses **insufficiency of the pylorus** and its connection with intestinal catarrh. At times the normal reflex closure of the pylorus does not occur; this is particularly notable in women with overstretched abdominal walls. The stomach is usually found distended; the symptoms are diarrhea shortly after meals and reflux in the stomach. Proper diet, hydrotherapy, and stomachics will usually cure the affection. [This theory is attractive and has been put forward by others in the past, but has not been proved. Much remains to be learned about the contractions of the stomach and the condition of the pylorus under varying circumstances.]

Enteritis.—W. C. C. Pakes and J. W. Washbourn⁶ record a case of fatal enteritis caused by the **streptococcus**. The man had violent gastroenteric symptoms, and died 30 hours after the disease appeared. Cultures from the heart, blood, peritoneal fluid, and other organs, as well as from the intestine, showed streptococci, and there were some large bacilli in the heart-blood and liver-cultures. The streptococcus was pathogenic to mice, but the bacilli did not grow in bouillon, glucose-gelatin, or agar. [A number of cases of this sort were observed in Paris and Hamburg during the last epidemic of cholera.] E. Libman⁷ records 2 cases of gastroenteritis in children. In the stools from both cases large numbers of streptococci were found; and in one case which was fatal streptococci were found in the blood just before death. These cocci killed mice, and the organisms were found in their blood and in their stools.

¹ Brit. Med. Jour., Dec. 25, 1897.

² Wien. med. Woch., May 28, 1898.

³ Vrach, No. 19, 1897.

⁴ Therap. Woch., July 25, 1897.

⁵ Arch. f. Verdauungskrankh., Band iii., Heft 2.

⁶ Brit. Med. Jour., June 18, 1898.

⁷ Med. Rec., Mar. 5, 1898.

The animals had diarrhea after the injection. The diarrheal symptoms and the severity of the disease depended upon the number of generations of removal of the culture which was used.

Intestinal Obstruction.—T. A. Bowes¹ records a case of intestinal obstruction which was fatal, and in which he found at the autopsy that obstruction had been due to **induration of the great omentum** around the transverse colon and subsequent contraction of the mass, which had almost shut off the lumen of the gut for about 6 in. The mass was not malignant, and was thought to be probably syphilitic.

C. Chenzinski² reports a case of intestinal obstruction which caused death, and which was due to the odd cause of **compression** of the bowel by **two lipomata** hanging from the mesentery on each side of the ileum.

D. W. C. Hood³ discusses the medical aspects of **appendicitis**, making the cardinal symptoms in the diagnosis pain, fever, local tenderness, and **immobility of the abdominal walls** during respiration. He constantly uses opium and strongly objects to aperients. Rendu⁴ describes 2 cases of **hysteria** which so counterfeited the symptoms of appendicitis that operation was undertaken. Such cases do not have fever, and Rendu believes that operation should not be undertaken unless fever exists, as such cases as those he reports may occasionally lead to unnecessary operation. [We have seen several cases of this sort.] J. Price⁵ during an operation for appendicitis, found in the appendix a full-sized **Ascaris lumbricoides**, which seemed to have been the cause of the appendicitis.

Colitis and Dysentery.—**Polypoid Colitis.**—A. Foxwell⁶ reports an interesting case of polypoid colitis in a physician, which followed an acute dysenteric colitis. The symptoms persisted after the acute attack, and right iliac colotomy was necessitated by intestinal obstruction. An artificial anus was subsequently established, and the transverse colon was opened in order to irrigate the intervening bowel. Large numbers of polypi came into view and were removed, but fresh ones constantly appeared in the opening, and the patient soon died from exhaustion. At the autopsy the mucous membrane from the ileocecal valve to within 3 in. of the anus was covered with these growths. The small intestine was healthy, excepting that 2 coils were bound down to the colon by adhesions. Examination of the polyps showed a central fibrous core, with radiating branches supporting a mucous membrane resembling that of the intestine. Foxwell thinks it might be wise in all cases of stubborn colitis to perform a right colotomy, in order to make applications directly through the large bowel. [We have encountered a very similar case within a few months, and considered the question of colotomy. The patient died of exhaustion, diarrhea, and bloody discharges. In a similar case we should urge operation.]

Mucous Colitis.—Mathieu⁷ defines mucous colitis as a hypersecretion of mucus which occurs in women who are sufferers from enteroptosis and are of a neuroarthritic diathesis. He treats the constipation with copious enemata and castor oil, and advises intestinal antiseptics, such as bismuth salicylate, resorcin, and naphthol. E. G. Trevithick⁸ reports a case which occurred in a woman of 46 years, and resembled mucous colitis. After severe obstipation the bowels finally moved, and in this movement was seen a grayish, rather translucent, hollow cast 7 in. long, resembling a pseudomembrane. Similar

¹ Lancet, June 18, 1898.

² Lancet, Sept. 18, 1897.

³ Va. Med. Semi-monthly, Jan. 29, 1898.

⁴ Sem. méd., p. 226, 1897.

⁵ Deutsch. med. Woch., Apr. 7, 1898.

⁶ Gaz. des Hôp., 1897.

⁷ Birmingham Med. Rev., Jan., 1898.

⁸ Bristol Med.-Chir. Jour., June, 1898.

substance was passed later. It was interesting that this gave no reaction for fibrin and was not composed entirely of mucus; the author thinks it was largely made up of degenerated cells from the mucous membrane.

P. C. Fenwick¹ records the case of a patient who passed on several occasions masses of flesh-like substance from the lower bowel. They were greenish in color, when stretched were of the shape of the gall-bladder, and had followed severe attacks of hepatic colic; the feces were clay-colored. Since the microscopic examination of these masses showed no resemblance to hydatids, Fenwick believes they were **casts of the gall-bladder**. Hale White and Golding-Bird² describe the case of a neurotic woman who had been a confirmed invalid from mucous colitis, the onset of which had followed exposure to wet 10 years before. There was constant constipation and the bowel-movements contained a varying amount of mucus, with tubular casts sometimes 20 in. in length; at times there was also blood. Pain was finally continuous. After other treatment had proved ineffectual, **right colotomy** was done to give rest to the colon; the artificial anus was kept open and the lower bowel was cleansed by repeated washing. After 5 weeks tenderness and sensitiveness had disappeared and the wound was closed. Recovery seemed complete, but she died suddenly from acute peritonitis a month afterward. A postmortem examination was not made, but death was thought to be due to rupture of a small pelvic tumor which was known to be present, and which was possibly an inflamed gland.

Dysentery.—Etiology.—L. L. Bertrand,³ after a study of the work of others and some experimental work of his own with various bacteria, reaches the conclusion that dysentery is not caused by any specific infection, but is a polybacterial infection, and may be produced by various microorganisms, such as the colon-bacillus, the streptococcus, the staphylococcus, and the pyocyaneus. The microorganisms exist in the air, in the water, and in the soil, and may reach the subject either by inspiration or by swallowing, and may remain latent until some lesion of the intestinal mucous membrane permits them to become pathogenic. Bertrand speaks very cautiously of the pathogenicity of the *Amœba coli*, and considers that its power of producing disease has been accepted with some precipitancy. [We agree entirely with the last view.] F. Roemer⁴ examined the stools of 19 patients, 15 of them adults with dysentery, 2 adults with enteritis, and 2 children with dysentery. All of the 17 adults had amebæ in the stools, but since there was no difference in the form of these parasites in the cases of enteritis and in those of dysentery, the author does not think this is evidence that the amebæ are the cause of dysentery, and he believes that there is no definite proof that amebæ can cause dysentery; their presence in some liver-abscesses being the strongest point in favor of their pathogenicity. He found a large number of Charcot crystals in the stools and a great many cercomonas in some of the cases.

H. F. Harris⁵ contributes a paper on **amebic dysentery**, based upon observations in 35 cases and postmortem studies in 5. Of his cases, 9 died, 12 recovered, and 4 improved, while in 10 the result is unknown. Besides the *Amœba coli*, cercomonas was found in the stools in 7 cases, trichomonas in 1, and the eggs of *Oxyuris vermicularis* in 1. Liver-abscess occurred as a complication twice, peritonitis twice, and appendicitis once. In the demonstration of the ameba he has found toluidin-blue the most satisfactory stain. Adding a drop of a watery solution of this stain to a small particle of the

¹ Brit. Med. Jour., Apr. 23, 1898.

² Tr. Clin. Soc., vol. xxix., p. 45.

³ Rev. de Méd., July, 1897.

⁴ Münch. med. Woch., Jan. 11, 1898.

⁵ Am. Jour. Med. Sci., Apr., 1898.

fecal matter and examining it immediately, it is found that the amebæ are killed instantly and the endosarc is stained intensely, while the ectosarc remains unstained until the lapse of several minutes. Weak solutions of the stain should be used. Occasionally small vacuolated bodies about the size of leukocytes and resembling amebæ in the stained preparations, but differing in many particulars, were found. For staining tissues he found hardening in corrosive sublimate and staining with Heidenhain's alum-hematoxylin stain most useful. As far as the internal structure is concerned, he found toluidin-blue the most useful differential stain. The specimens, fixed in corrosive sublimate or alcohol, are first stained with eosin or benzo-purpurin, and after this for 20 to 30 minutes in a weak solution of toluidin-blue. The excess of the latter stain is washed out with alcohol in 3 or 4 minutes, and the section cleared in cedar-oil or xylol. The author further discusses the general pathology and symptomatology as illustrated by his first case.

Symptoms.—Delafield¹ divides inflammation of the colon into **five forms**: the acute catarrhal variety, in which there is an increased production of mucus and serum, but no grave symptoms, and which is of short and favorable course in all except children; the acute purulent form, in which there are signs of septic poisoning and the prognosis is commonly bad; the acute productive, necrotic variety, which is a severe form, the most marked effect being upon the glandular layer of the intestinal wall (this also shows septic symptoms, but is of somewhat more favorable prognosis than the last form); the fourth form, in which there are patches of false membrane, sometimes with necrosis of the whole wall; and, finally, the amebic form, which is due to infection of the connective-tissue layer by the *Amœba coli*. The latter form is often associated with abscess of the liver. In treatment, if the disease is low down, it is best managed by local irrigations; but if high up, it must be treated by drugs by the mouth. Sometimes the two methods are well combined. For irrigation Delafield often uses an infusion of flaxseed, if there is no necrosis; if there is necrosis, he uses 1:10,000 bichlorid, chlorid of zinc, or formalin. In cases situated higher up he uses bismuth and opium, and in persistent cases ipecac in large doses, with small doses of castor oil, silver nitrate, salol, or naphtholin.

H. W. Carson² records an instance of **lead-poisoning** complicated by a severe and fatal ulcerative colitis which affected the mucous membrane of the whole of the large intestine. From his study of the literature he concludes that this is an extremely rare complication.

W. T. Howard, Jr., and C. F. Hoover³ report 4 cases of tropical dysentery, and state that this disease seems hitherto to have been unrecognized in Cleveland, O., in which place these cases were observed. Three of the cases had liver-abscesses, and in 2 of these the *Amœba coli* was found. In the other case, one of acute abscess, the pus was lost before microscopic examination was undertaken. In 2 cases perforation occurred into the right pleural cavity. In 1 case pus was found in the pericardium, and amebæ were seen in sections from the pericardium. In this case the heart-muscle was found in a condition of fatty degeneration. They note that Litten's diaphragmatic phenomenon is of value in some cases in the diagnosis of liver-abscess. In 1 case it was much diminished on the right side, while present on the left.

Dilatation and Adhesion of the Colon.—F. Treves⁴ discusses **idiopathic dilatation** of the colon. He refers to 2 forms of cases: one in elderly persons, mostly men above 50 years of age, and the other in children,

¹ Am. Jour. Med. Sci., Oct., 1897.

² Am. Jour. Med. Sci., Aug. and Sept., 1898.

³ Lancet, Sept. 4, 1897.

⁴ Lancet, Jan. 29, 1898.

whose symptoms practically date from infancy. In reviewing the cases occurring in childhood, he finds that these are usually congenital, and involve the lower section of the colon in particular. There is usually hypertrophy of the dilated bowel. He concludes that there is usually some congenital defect in the terminal part of the bowel. He reports an interesting case in a girl of about 6 years, in whom he first performed colotomy, but later excised the entire descending colon, sigmoid flexure, and rectum. The child speedily recovered. In this case there was undoubtedly a congenital narrowing of part of the large intestine.

H. Westphalen¹ records a case of **adhesion of the colon to the liver**. The man had had disturbance of digestion for years, with attacks of severe pain in the region of the liver, followed by vomiting. Twice he vomited blood. Icterus had never been present and no gall-stones could be found. The diagnosis of ulcer, with probable adhesion of the colon to the stomach, was made, since the attacks of pain were closely connected with the act of defecation. They were always relieved by a warm bath, but not improved by atropin injections (which indicated that it was not simple spasm of the bowel); and the liver-dulness always partly vanished during these attacks and gave place to tympany, indicating marked local meteorism at that point. Operation was undertaken, when the pylorus was found stenosed and hard, but there was no adhesion between the stomach and colon. Death ensued after a second operation, necessitated by symptoms of intestinal obstruction; an old contracted ulcer just below the pylorus was found. There were recent adhesions, which had caused obstruction in the intestines, and an old adhesion of the colon to the edge and under surface of the liver.

Treatment of Constipation and Enteritis.—Traversa,² after careful experimental work, decides that **atropin** does not increase peristalsis, but certainly decreases it. It should therefore not be used in constipation unless this is due to irritation, such as occurs in lead-poisoning. In the same series of experiments he found that **pilocarpin** accelerated peristalsis. The same author³ finds from experiments that **physostigmin** increased peristalsis and caused general violent contractions of the intestines. These ceased after the administration of atropin. They are due to excitation of the peripheral motor nerves, so that its action, according to Traversa, is exactly the same as that of pilocarpin. Holstein⁴ considers **constipation** frequently due to toxemia, and finds that the administration of large doses of **creosote** will often overcome it, probably by overcoming the intoxication. Mongour and Bergonie⁵ have been able to overcome a severe habitual constipation, with copremia, which was entirely rebellious to purgatives and enemata, and in which death seemed imminent, by using **electricity**, with the positive pole on the abdomen and the negative in the rectum. Immediate expulsion of feces occurred. The electricity was used for 3 months, and the patient ultimately recovered. G. Acheson⁶ contends that the use of hot **rectal enemata** is a prolific cause of atony of the rectum, while cold water is not so objectionable, and acts as a tonic if not too long continued. L. Pfaff⁷ believes that in the **dietetic treatment** of constipation substances which are very indigestible are too freely prescribed, and thus constipation is often made worse. He points out that those vegetable substances containing tannic acid should be excluded from the dietary. Venutis and Barbagallo⁸

¹ Arch. f. Verdauungskrankh., Band iv., Heft 1.

² Ibid., Jap. 1, 1898.

³ Arch. d'Elect. méd., No. 52, 1897.

⁷ Boston M. and S. Jour., Sept. 9, 1897.

² Il Policlinico, Nov. 15, 1897.

⁴ Sem. méd., Sept. 1, 1897.

⁶ Brit. Med. Jour., Oct. 30, 1897.

⁸ Therap. Woch., July 25, 1897.

have used **airol** in a number of cases of acute and chronic diarrhea, some of which were tuberculous, with success and with no harmful results. The dose used was from 2 to 5 gr. Paschayan¹ has noted that the natives of Palon used **curdled milk** in acute enteritis, and improved rapidly under its use. The author has used it since this observation in enteritis, dysentery, acute and chronic gastritis, and typhoid fever, and finds that it lessens the diarrhea or dyspeptic symptoms, is a pleasant, cooling drink, and is easily digested. M. Mosse² finds that, of numerous drugs experimented with, only **actol** (silver lactate) caused a marked decrease in the ethereal sulphates of the urine when there was coincident constipation. Although chlorid of silver and argonin are bactericidal, there was no such effect noticed in their action in the intestines, nor was there in the action of dermatol, tannigen, or tannalbin. The latter even caused an increase in the ethereal sulphates. Löwenthal,³ in discussing disinfection of the intestine, states that he has determined the aromatic sulphates in the urine after the administration of **amyloform**; he found that these greatly decrease, although the formaldehyd which amyloform produces in the intestine was distinctly constipating. From these results he recommends amyloform as an intestinal antiseptic. F. Wyatt-Smith⁴ states that his experience has taught him that opium is poisonous in tropical dysentery. The treatment which he found most valuable was large doses of **magnesium sulphid** with sulphuric acid, some cases improving astonishingly on this treatment. J. W. S. Attygalle⁵ has had encouraging results from the use of **ammonium chlorid** in the treatment of dysentery. He gives 60 gr. every 4 hours, and finds that this rapidly decreases the amount of blood and the severity of the pain. G. Daremberg⁶ advises the treatment of dysentery in hot countries with the bark of **simarouba**, made into a decoction and drunk almost *ad libitum*. W. J. Buchanan⁷ believes that the treatment of dysentery with **mercuric chlorid**, combined with opium and nux vomica, is followed by fewer recurrences than is any other method of treatment of which he knows.

Tumors of the Intestine.—P. Wollheim⁸ records an extremely interesting and remarkable case of abdominal tumor which was associated with severe vomiting, constipation, and severe pain, and sometimes with hematemesis. The tumor fluctuated, and was first thought to be an echinococcus-cyst of the liver. It evidently ruptured, however, and when felt afterward was below the liver, and was then considered a pancreatic cyst or a hydronephrosis. But the fluid was hemorrhagic when aspirated, and the diagnosis was very uncertain. The patient's condition became graver; operation was undertaken, and the tumor was found to be a cyst within the serous coat of the small intestine, resultant upon the venous hemorrhage. The hemorrhage had dissected loose the serous coat around the whole circumference of the bowel, excepting where the mesentery was attached; the tumor formed was as large as a child's head. The author thinks that the hemorrhage had probably been originated by severe constipation. The patient recovered entire health after the operation. [Similar cysts have been observed in the wall of the stomach.]

R. Schmidt⁹ records 2 cases of **lymphosarcomatosis** of the small intestine. The first case had diarrhea, colicky pains, and edema spreading from his lower extremities upward. The stools were very offensive, containing

¹ Méd. mod., Aug. 25, 1897.

² Zeit. f. physiol. Chem., Band xxiii, S. 160.

³ Berlin. klin. Woch., Nov. 22, 1897.

⁴ Brit. Med. Jour., Jan. 29, 1898.

⁵ Ibid., May 7, 1898.

⁶ Gaz. hebdom. de Méd. et de Chir.

⁷ Practitioner, Dec., 1897.

⁸ Münch. med. Woch., Feb. 8, 1898.

⁹ Wien. klin. Woch., May 26, 1898.

mucus. There was some anemia, but no leukocytosis. After the patient's death the ileum was found diffusely infiltrated for some distance with lymphosarcoma. This also affected the vermiform appendix. The second case had pain in the epigastrium, with marked emaciation and edema, and had a tuberculous history and tuberculosis of the lungs, so that the abdominal disease was thought to be tuberculosis of the peritoneum, but lymphosarcomatosis of the jejunum was found. From this case and others reported, Schmidt reaches the conclusion that peritoneal tuberculosis and lymphosarcomatosis of the intestine are very similar in appearance. Among early symptoms in lymphosarcomatosis are edema and cachexia. There is no leukocytosis, but hematoblasts are usually abundant. Abdominal pains are commonly present, but tenderness is often absent.

Letulle¹ records an instance of development of **carcinoma** on the base of a duodenal ulcer. The man in whose body this lesion was discovered had suffered from melena and other symptoms of duodenal ulcer. Upon his death the first part of the duodenum was found ulcerated, and there was a colloid cancer developing near the center of the ulcer.

Heulin² gives an elaborate study of **primary cancer of the duodenum**. It rarely occurs in patients under 40 years of age. The causes are to be sought in the limitation of the motion of the duodenum, while the jejunum is quite motile, the duodenum being thus subject to injury. The duodenum is also subject to repeated changes in the chemical reaction of its contents, to repeated distention from the discharge of the contents of the stomach, and to traumatism from the pressure of the overloaded colon. Cancer in this situation usually causes marked obstruction, and gives rise to 3 forms of clinical symptoms, depending upon whether its location is above or below the papilla of Vater, or includes the papilla. In the first 2 forms the symptoms greatly resemble those of dilatation of the stomach; the important point separating the individual forms from each other being the presence or absence of bile in the vomit. The diagnostic points of value in separating this disease from cancer of the pylorus are that the latter is more apt to be palpable and is less commonly associated with hematemesis, but is more commonly associated with metastatic growths. The intolerance for food is less marked in duodenal cancer and the progress is much more rapid. When the cancer involves the papilla of Vater, it, of course, causes symptoms of biliary obstruction, but it varies from primary biliary cancer in that nodules in the liver are rarely to be felt. It is interesting that in his examination of the literature Heulin has discovered no case in which perforation into the peritoneal cavity occurred, but several cases have ended with violent hemorrhage.

DISEASES OF THE PERITONEUM.

Tyson³ calls attention to the fact that **tympany** in the flanks may be observed with considerable frequency **in ascites**, and states that he has observed this in a large number of his own cases, even when the effusion was of considerable size. [In our experience tympany over the head of the colon is habitual in cases of ascites, unless the amount of fluid be excessive, and tympany on the left side is almost as frequent.]

H. Ehret⁴ records 2 cases of heart-disease and 2 of hepatic cirrhosis, in all of which extreme ascites caused such enormous distention of the **umbilicus**

¹ Gaz. des Hôp., Dec. 9, 1897.

² Gaz. hebdom. de Méd. et de Chir., Feb. 13, 1898; Thèse de Paris, 1897.

³ Jour. Am. Med. Assoc., Aug. 7, 1897.

⁴ Münch. med. Woch., Apr. 12, 1898.

that this finally **ulcerated and ruptured**. In 1 case the intestines and mesentery were present in the sac, and Ehret notes that this is much more common in ascites with umbilical hernia than in ascites with inguinal hernia, since in the latter case the contents of the abdomen are floated upward. The

s, and in some cases varices orrhage. This occurred in

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ascites in a woman whose was found at the autopsy to the pancreas. The ascites made by the growth of the es which occurred in a man, s termed catarrhal fever, in n and a feeling of oppression ppeared edema of both lower he came under observation Day undertook paracentesis eeks, 2 to 3 gallons of fluid The patient's general health he inconvenience of the large ere was an examination for

peritonitis. This condition ionic from the first. Some- symptom of any kind, but nite results are those due to

Biliary obstruction may be cases intermittent jaundice d is based chiefly upon the

neal adhesions, note the ion and its continuance. It and less severe. Adhesions minal operations often leave be broken up by subsequent is antiseptic care during the ves and enemata to keep up prevented.

atid cysts attached to the verse colon. There were 9 resent, but no other part of

VER.

iscusses the effects of fara- as applied electric stimulus nge in uropoiesis, and finds mination of urea, but after the second or third day of this treatment the amount of urea increased and

¹ Presse méd., Oct. 9, 1897.

² Klin. therap. Woch., Jan. 2, 1898.

³ N. Y. Med. Jour., Feb. 12, 1898.

⁴ Med. News, Oct. 9, 1897.

⁵ Lyon méd., Nov. 14, 1897.

⁶ Tribune méd., Dec. 1, 1897.

remained increased for 2 or 3 days. This is, he believes, due to the muscular contractions caused by the electric current.

W. Bain¹ has made observations upon the **effect** of some **drugs** and **mineral waters** on the secretion of human bile and upon its composition. His results were that exercise and diet greatly influenced the secretion of bile; digestion increased the secretion very much; exercise did likewise, unless free perspiration occurred, when the amount was not increased; more bile was secreted during the day than at night. The effects of drugs, briefly stated, were that Carlsbad water, Kissingen water, sodium salicylate and benzoate, and euonymin increased the quantity of bile and the amount of solids. Podophylloresin and iridin increased the amount of solids without affecting the quantity. Montpelier spring water and podophyllotoxin diminished both the quantity and the solids to a slight extent, while hot water with soda had no effect.

Icterus.—R. Schmidt² has investigated the **metabolism** in a case of **catarrhal icterus**. There was distinct loss of nitrogen during the more serious periods of the illness. From the results of his study he believes that the theory of the production of icterus by a change in the direction of secretion, which causes the bile to be poured into the blood instead of the intestine, is not favored by his case. In this case he believes the icterus was certainly caused by obstruction. It was interesting to note that the amount of ethereal sulphates in the urine did not correspond with the irregularity and the amount of intestinal putrefaction. [In one of our cases the amount of ethereal sulphates varied greatly at different times without definite change in the symptoms.]

O. Damsch and A. Kramer³ record an epidemic of **icterus** in children, which was **associated with catalepsy**; the children allowing their limbs to remain motionless in whatever position the examiner placed them. This condition persisted for about 9 days, when it was followed by slow improvement. The liver was enlarged in all these cases, but it was not tender. The cases all recovered. They were thought to be due to special infection. In another instance which they record there was marked psychosis in a case which strongly resembled acute yellow atrophy. On the eighth day of a severe jaundice there was general increase in the symptoms, hemorrhage from various mucous membranes, with collapse and alternation of stupor and excited delirium. Leucin and tyrosin were not present, and it could not be determined that the liver had decreased in size. The most astonishing improvement, with ultimate recovery, followed upon the hypodermic injection of $1\frac{1}{2}$ liters of normal salt solution. In another case a most intense melancholia agitata occurred in the course of icterus, and death followed from pneumonia. No distinct changes in the central nervous system could be found, and the authors thought that the icterus was the cause of the mental change, probably through setting up severe disturbances of metabolism.

G. Hayem⁴ presents the records of 5 cases of **paroxysmal chronic icterus, with enlargement of the spleen**. All cases had moderate chronic jaundice, with occasional exacerbations. The liver was not enlarged during the interval, but the spleen was enlarged and hard at all times. During the exacerbations the liver increased in size. The feces retained their color, except during the crises, when they became putty-like. During the crises the urine gave Gmellin's reaction; at other times this reaction was not present. Ascites, tympanites, and hemorrhoids were usually absent, but there were commonly disturbances of digestion. After the crises there was usually some

¹ Brit. Med. Jour., June 25, 1898.

³ Berlin. klin. Woch., Mar. 21, 1898.

² Centralbl. f. innere Med., Jan. 29, 1898.

⁴ Presse méd., Mar. 9, 1898.

polyuria. Gall-stones were never found. Hayem believes that the disease is a benign form of infectious jaundice which has not been previously described. In 1 case he punctured the spleen and obtained cultures of diplococci that resembled the pneumococcus. The source of infection may be the digestive tract. The treatment which he recommends consists chiefly in hygienic measures, with careful attention to the digestive functions and the excretions, with milk-diet during the severe crises.

A. Albu¹ records a case of **chronic intermittent icterus**. The patient at the time of the report was 16 years old, and had been subject to repeated attacks of jaundice since the sixth year of life. These were not associated with pain, and no gall-stones had ever been found; but the liver was enlarged, hard, and somewhat tender. Albu considers the case one of cholelithiasis, upon which hypertrophic cirrhosis had developed. He considers cholelithiasis much more common in children than is usually believed.

Warner² has studied 57 cases in which jaundice occurred in early syphilis, and states that **sypilitic jaundice** is characterized by its occurrence early in the second stage, with new specific symptoms; by its recovery under specific treatment; and by the absence of coincident or preliminary disturbances of the stomach. In some atypical cases the jaundice may occur only in a relapse or before the relapse. The frequency of this complication is 0.37%. The intensity of the jaundice varies. It may rapidly increase for a short time after commencing anti-syphilitic treatment, but soon disappears. The cause is either compression by enlarged glands in the portal fissure or obstruction from an eruption in the intestinal tract.

E. O. Daly³ records a case of **icterus gravis** in a woman of 26 years, who was suddenly taken ill with faintness, vomiting, and weakness, followed by deep jaundice and prostration, with rapid pulse and some fever, and with almost complete suppression of the urine. The liver-dulness did not decrease, but there was deepening coma, and the patient expired. There was no phosphorus in the vomit, and no leucin or tyrosin in the urine. There was no postmortem, but a diagnosis of a condition allied to acute yellow atrophy was made, since the absence of decrease in the size of the liver and of leucin and tyrosin from the urine, and the complete suppression of urine, seemed to indicate that it was not acute yellow atrophy.

F. Pick⁴ records a case of **recurrent hepatic fever** in a woman of 49, who for 18 months before death had attacks of pain about the liver, with fever and chills, and followed by intense jaundice. No stones were ever discovered. Some of the attacks were painless, and in almost all of them there was marked leukocytosis. Pick thinks that the frequent absence of pain shows that the disease was not irritative, and he believes that it was probably due to infection, perhaps by the *Bacillus coli communis*. The disappearance of leukocytosis between the attacks showed that there was no suppurative condition. He also observed that the urea, total nitrogen, and ammonia all diminished in like degree during the attacks, but this was due simply to diminution in the amount of food and drink taken.

Acute Yellow Atrophy.—Fison⁵ records a case of acute yellow atrophy which was remarkable in that it occurred in a girl only 12 years of age, and without any definite cause. Death occurred 60 hours after the onset of the violent symptoms, which had been preceded by about 10 days of what was considered ordinary jaundice. At postmortem the liver was found small.

¹ Deutsch. med. Woch., Mar. 31, 1898.

² Münch. med. Woch., July 6, 1897.

³ Lancet, Apr. 30, 1898.

⁴ Proc. Fifteenth Congress of Internal Medicine.

⁵ Lancet, July 17, 1897.

fatty, and hemorrhagic. The hepatic cells were granular and fatty and in parts completely broken down. There was no leucin or tyrosin observed in the urine or in the liver.

Cirrhosis.—Lancereaux¹ has fed rabbits, guinea-pigs, and dogs on **potassium sulphate**, and has produced in them the appearance of typical alcoholic hepatic cirrhosis. He was led to this because French wines contain potassium sulphate, and because of 210 cases of cirrhosis, which he has seen, all took wine either alone or combined with other alcoholics. He believes that it is the potassium sulphate that causes the cirrhosis. [This theory would not account for the cirrhosis of whiskey-drinkers.] Riche,² in discussing Lancereaux's theory of the production of **cirrhosis of the liver**, notes that for years past the amount of potassium sulphate in wine has been decreasing, until now it is but half what it was in 1891, but there has been no corresponding decrease in the number of cases of cirrhosis of the liver.

J. Barr,³ in considering cirrhosis of the liver, states his belief that the liver is usually enlarged at first, even in the contracting form, and that this enlargement is due to cardiac asthenia with **tricuspid incompetence**, resulting in congestion of the organ. The primary form that is atrophic from the beginning is so, he believes, because incompetence of the tricuspid valve is absent. [Statistics prepared from records of autopsies show that the liver is enlarged to the end of life in a majority of cases of alcoholic cirrhosis.] J. L. Morse⁴ studied the records of 37 cases of cirrhosis of the liver, and found that among these there were 13 instances of enlarged livers, while 11 were of normal size, and 12 were smaller than normal, so that these 3 varieties were of about equal frequency. In all cases there was an alcoholic history when this had been sought for. Fourteen cases occurred in females. Ascites was only about half as frequent with enlarged livers as with other forms, while jaundice was much more common and more persistent with enlarged livers; hemorrhage being less frequent with the class showing enlarged livers and nutrition being least impaired in this form. In all but 6 cases there was enlargement of the spleen. This, in the author's belief, is due to the same irritant cause as the liver-disease, and is not secondary to the latter. Calabrese⁵ has investigated the condition of metabolism in cirrhosis of the liver, and finds that absorption of food is poor, owing to venous stagnation in the intestines. This improves after paracentesis. Usually the urea is decreased, while the excretion of ammonia is increased, and in advanced cases ammonium carbonate when ingested is not transformed into urea. The acidity of the urine is increased. In very severe cases one finds lactic acid, leucin, and tyrosin in the urine. He did not find alimentary glycosuria in all cases of cirrhosis.

A. Gouget⁶ records the case of a woman with hypertrophy and cirrhosis of the liver, in the last 2 weeks of whose life there was an evident **peripheral neuritis** of all 4 members, and the postmortem histologic examination confirmed this diagnosis. He attributes this neuritis to an intoxication, owing to hepatic insufficiency. An alcoholic neuritis was improbable, owing to the fact that the signs of neuritis developed only 2 weeks before death, when she had been for 2 months without alcohol. The preceding alcoholism probably had a predisposing effect upon the neuritis, however. The toxicity of her urine had been markedly increased.

Sicard and Rémlinger⁷ describe a case of **Hanot's hypertrophic cir-**

¹ Bull. de l'Acad. de Méd., Sept. 7, 1897.

³ Liverpool Med.-Chir. Jour., July, 1897.

⁵ Gaz. degli Osped. e delle Clin., Oct. 10, 1897.

² Ibid., Mar. 22, 1898.

⁴ Boston M. and S. Jour., Mar. 10, 1898.

⁶ Rev. de Méd., July 10, 1897.

⁷ Ibid., Sept., 1897.

rhusis of the liver of rapid development, which was peculiar in that the shoulder and arm and the side of the chest and pelvis were lower on the right than on the left side. This deformity came on when the liver was but little enlarged, and was, therefore, probably not due to dragging of the large liver.

Eichhorst¹ observed the case of a man of 47, an alcoholic, who noticed considerable weakness and cyanosis of his lower extremities, with dyspnea and weak and irregular pulse. His liver was enlarged, there were icterus and ascites, and the spleen was very much enlarged. There was some fever. Two days before death the parotid became tumefied. At autopsy there was found **acute monolobular cirrhosis** of the liver, with chronic multilobular cirrhosis. This was more of the biliary than the periportal type, but in certain lobules there was marked round-cell infiltration and new formation of bile-canaliculi, with local degeneration of the liver-cells. The latter lesions seemed, therefore, to be acute, and to have arisen on the basis of a chronic cirrhosis. [A similar case has come under our observation. A man of about 30 was admitted to the hospital suffering from chronic alcoholism. He later developed jaundice, with fever and hepatic enlargement, and died after 2 weeks. There was found an old cirrhosis, with evidence of much recent inflammatory infiltration.]

Carmono y Valle² reported the characteristics of a **form of cirrhosis** of the liver which seems **peculiar to Mexico**, resembling Hanot's hypertrophic cirrhosis, excepting that its course is rapid, the spleen is not swollen, fever is constant, and ascites nearly so. Pathologically there is proliferation of connective tissue about the superficial veins of the liver, and this spreads within the lobules, even to the finest divisions of the veins, and may entirely shut them off and result in necrotic areas or cavities. The chief symptoms are enlarged and hard liver, icterus, fever, either remittent or intermittent, hematemesis, constant bilious diarrhea, ascites, ataxia, and adynamia. It usually ends fatally within 6 or 8 months.

Hubler³ records a case of **chronic hyperplastic perihepatitis** (Zucker-gussleber of Curschmann). He first reports a case under his own observation, occurring in a woman of 46 years, who had always been well and was well preserved. After considerable anxiety and trouble she became ill and complained of palpitation and asthma, though no disease of the heart or lungs could be discovered. Later there were fever and attacks of biliary colic, with moderate jaundice. These passed off in a short time without the passage of biliary calculi. The liver was normal and the gall-bladder could not be felt. When admitted to the hospital there were great emaciation, anemia, and ascites. The heart and lungs were normal; the size of the liver could not be determined; the spleen was not enlarged. The ascites was relieved by puncture, light-yellow liquid being removed. The lower border of the liver could not be palpated on account of the extreme tenderness. A month later an attack of biliary colic occurred, with fever, jaundice, and great pain. The gall-bladder could be felt distended. The abdomen again filled with liquid and was tapped. The liver was then found distinctly smaller than normal. After this the patient's condition varied, the symptoms detailed alternating one with another. The stools were usually normal, but during the attacks of jaundice became light-colored. She was aspirated a number of times. Finally the ascites on one occasion ruptured through the bowel, but subsequently reaccumulated and was aspirated. Eventually the patient died of increasing weakness. Prior to death thrombosis of both legs occurred. The autopsy showed firm

¹ Virchow's Archiv, vol. cxlviii., 1897.

² Proc. Internat. Med. Congress, Moscow, 1897.

³ Berlin. klin. Woch., Dec. 20, 1897.

adhesion between the diaphragm and liver. The liver was small and was everywhere covered with a capsule of porcelain-whiteness, from $\frac{1}{2}$ to 1 cm. thick, and very hard. On section this was found to be homogeneous and milk-white throughout. The liver was evidently compressed, and on section parts of the parenchyma projected above the surface. The acini were clearly marked and the centers congested. The gall-duets were patulous. There were several cholesterin-stones in the gall-bladder. The author alludes to a case reported by Rumpf, to the cases of Curschmann, and to one of Pütz.

H. M. Fisher¹ records a case of transposition of the viscera in which the diagnosis was confirmed by radiography. The liver was enlarged, and, as a sarcoma was suspected, celiotomy was undertaken and some of the liver-tissue removed; but microscopic examination showed that it was an interlobular cirrhosis which had extended from a perihepatitis, and which seemed to be the result of a previous injury in this region.

J. Barr² discusses the **treatment of cirrhosis of the liver**. He believes that all alcohol should be permanently interdicted, and that lavage with a weak alkaline solution is the best method of relieving the gastric symptoms, though a large blister over the epigastrium and liver is very efficacious. The amount of animal food should be limited, as should all rich, highly seasoned food, and drinks should be confined to alkaline waters, milk, tea, and coffee. And the amount should be strictly limited, in order to limit transudation into the peritoneal sac by preventing overburdening of the heart. One pint and a half of liquid a day is sufficient. Rest is an important matter. In treatment he uses small doses of calomel, salol, and creosote to prevent decomposition in the intestine, and digitalis to regulate the heart and the renal excretion.

Berger³ describes a case of **abscess** of the liver in which the symptoms appeared 6 years after the man had suffered from tropical dysentery. Operation resulted in cure.

H. Jackson⁴ describes a case that had symptoms of **appendicitis** 3 years before the time of the report, and when admitted to the hospital shortly before death was septic and was believed to have **abscess** of the liver. At the autopsy multiple abscesses were found, which seemed to be due to infection from an old suppuration about the appendix. In a second case the patient died of abscess of the liver, which was found after death to be probably amebic in origin and was associated with chronic ulcers of the colon.

L. P. Hamburger⁵ describes 2 cases of secondary **melanosarcoma** of the liver. In both cases there had been disease of the eye; in the first case the eye had been removed, and in the second it had atrophied and was subsequently removed. The livers of the patients were enlarged. One of the patients left the hospital before death, and the other presented before death nodules in the skin and profound cachexia, with dark urine, which turned black upon the addition of iron chlorid. The autopsy showed involvement of the liver, kidneys, and various other organs with sarcoma. Abel, in discussion, stated that it is probable that the pigment-melanin does not come from the blood, since pure melanin does not contain iron and does contain sulphur.

D. J. M. Miller⁶ records a case of a large **syphilitic tumor** which gradually disappeared under the use of potassium iodid. The patient, a man of 45, was first seen in Jan., 1894, with an abdominal tumor, and suffering

¹ Univ. Med. Mag., July, 1897.

² Liverpool Med.-Chir. Jour., p. 236.

³ Gaz. hebdom. de Méd. et de Chir., July 18, 1897.

⁴ Boston M. and S. Jour., Feb. 17, 1898.

⁵ Bull. Johns Hopkins Hosp., Mar., 1898.

⁶ Univ. Med. Mag., Mar., 1898.

from pain and vomiting. He had had lues in 1874, and skin-eruptions 12 years later. Enlargement of the right side of the abdomen began in 1893. He had a few brownish stains along the tibial spines, but otherwise no signs of syphilis. He was emaciated, having lost 20 pounds in 7 months. The tumor was about the size of a half orange, and irregular, hard, and resistant. The surface was nodular, some of the nodules being plainly felt. There was no tenderness. The spleen seemed somewhat enlarged. Examination of the stomach-contents showed the presence of HCl. In April he left the hospital, having improved under the use of potassium iodid and mercuric chlorid. The tumor had decreased perceptibly. In Dec., 1895, he went to Johns Hopkins Hospital, having lost much weight and the tumor having again increased in size. The conditions this time were much the same as at first. Under potassium iodid he again improved, the tumor growing somewhat smaller. In Feb., 1897, he was in splendid condition, having gained 50 pounds in a year. The epigastric enlargement had disappeared entirely and the edge of the liver could not be felt.

R. Lennhoff¹ records a number of cases in which the diagnosis between **syphilitic disease** of the liver and **echinococcus-cysts** was extremely difficult, and others in which these 2 conditions were difficult to distinguish from other diseases. The author has noted in a number of cases of echinococcus-cyst that on deep inspiration a furrow forms above the tumor, between it and the edge of the ribs, and since echinococcus-cysts alone were likely to be situated in a position to cause such a sign, Lennhoff subsequently made the diagnosis of echinococcus-cysts in several cases because this sign was present; and since operation confirmed his diagnosis in all cases, he insists that this sign is of importance.

W. C. Devereux² records a case of cirrhosis of the liver, with ascites, in which the liver was at first small, but afterward increased very considerably in size. Since there were signs of a cyst, he tapped, and withdrew fluid which contained abundant liver-cells, but no hooklets or cancer-cells. He believes that it was a **simple cyst** of the liver, but does not attempt to explain the exact nature and origin of the cyst.

R. Crawford³ reports a case of "**anteverted, wandering liver**," so called because the liver was not distinctly movable, but was rotated upon its axis. The liver-dulness extended from the sixth rib to below the umbilicus. The surface was smooth. There were emaciation and deep jaundice, and the patient died after increase in size of the liver and progressive exhaustion. The liver was found completely anteverted, lying in the long axis of the abdomen. Its consistence was firm, and on section it was deeply bile stained; and the bile-ducts were distended to the size of one's finger. The liver was extremely edematous, but was not particularly mobile. Crawford has discovered but 2 other cases which presented signs like his during life; in 1 of these the conditions were practically identical with those in his own case. The jaundice seems to have been due to kinking of the duct. There was no enteroptosis, but the intestines were quite movable, and there was inguinal hernia. The edema of the liver was probably due to pressure and traction upon the vessels.

DISEASES OF THE BILIARY PASSAGES.

W. Hunter,⁴ in discussing **cholelithiasis** and its etiology, states that it is a local disease, and is not dependent upon general nutritional or metabolic dis-

¹ Deutsch. med. Woch., June 30, 1898.

³ Ibid., Nov. 6, 1897.

² Lancet, July 24, 1897.

⁴ Brit. Med. Jour., Oct. 30, 1897.

turbance. Age, sex, pregnancy, sedentary habits, and other conditions have undoubted influence, but do not offer in themselves an immediate cause. They show only that anything which causes stagnation of the bile will aid in inducing the affection. Cholesterin and bilirubin calcium are the chief constituents of gall-stones. The former is produced by degeneration of the epithelium; the latter exists in the bile, with the bilirubin and the calcium then uncombined, and the insoluble compound is precipitated by the presence of albumin, which is produced by catarrhal inflammation. This inflammation is due to direct infection with microorganisms, or to the excretion of irritant products through the bile. In the latter case gall-stones are apt to be formed in the intrahepatic bile-ducts.

H. Hartmann¹ records the results of the work of his pupil, Mignot, on the **pathogenesis of biliary calculus**. Bacteriologic examination of calculi from 5 persons was negative in 2 cases, while the colon-bacillus was found in 3, in 1 of which cases the bacillus was in the center of the calculus and the bile was sterile. He caused the formation of calculi by inoculating animals with attenuated cultures of the colon-bacillus. Aseptic foreign bodies and simple stagnation of bile did not produce calculi, and his conclusion is that gall-stones are due to infection. J. E. Graham² discusses elaborately the symptoms and diagnosis of cholelithiasis, mentioning especially the occurrence of pyloric spasm during these attacks. This condition is extremely difficult to diagnose, since there is often an excess of free HCl in the stomach at the time, and one is apt to think that the stomach is the seat of the pain. In the general discussion, G. Baumgarten stated his belief that while gall-stones are often the cause of cancer, the relation is frequently reversed, and that cancer frequently causes formation of gall-stones. He also mentioned a case of sudden acute general peritonitis with rapid death, in which there was found a small perforation of the gall-bladder, and about this a spot the size of a pea, in which the muscular coat of the bladder was absent. There was no inflammation or ulceration around it, even in microscopic sections. The common duct was thickened and dilated in parts, and in this duct, and in the cystic duct as well, several gall-stones were found.

H. L. Elsner³ records a number of interesting cases exhibiting the possible course that gall-stones may take. In one case an enormous stone ulcerated into the small intestine, and this was followed by the discharge of a second. In another case the symptoms were those of carcinoma of the pylorus. Another case presented the symptoms of malignant disease of the abdomen, but it was found that these symptoms had resulted from a gall-stone working its way from the cystic duct into the retroperitoneal space. In another case a **gall-stone** was found in the **pelvis of the kidney**.

F. F. Ward⁴ reports a case of **occlusion of the common bile-duct** by gall-stones, the symptoms **resembling carcinoma of the stomach**. The patient, a woman of 46, had passed the menopause 3 years. She had always been strong and was the mother of 10 children. During 6 months she had suffered from pains in the epigastrium after eating. These were sometimes shooting in character and quite sharp, and at times were attended with extreme nausea. She had lost flesh and was slightly jaundiced or cachectic. Physical examination showed the lower border of the stomach 4 finger-breadths below the umbilicus; the upper border about 1 finger-breadth above. The abdominal aorta could be felt above the lesser curvature. In the region of the pylorus a small tumor could be felt, which moved up and down with the respirations, but was

¹ Presse méd., Mar. 2, 1898.

² Brit. Med. Jour., Oct. 30, 1897.

³ Med. News, Feb. 5, 1898.

⁴ Med. Rec., Jan. 22, 1898.

not freely movable by palpation. Examination of the stomach-contents showed: total acidity, 18; HCl absent; no lactic acid; considerable mucus. The case was regarded as one of carcinoma, until an attack of sharp pain having the characteristics of biliary colic occurred, when she was submitted to operation, and an impaction of the common duct by two large stones was discovered. These were removed and the patient eventually completely recovered.

A. Krokiewicz¹ records the case of a woman of 57, who had attacks resembling gall-stone colic, followed by enlargement of the liver; a diagnosis of **cirrhosis secondary to gall-stones** was made. At the postmortem the gall-stones were found, but there was also discovered, beside cirrhosis of the liver, some carcinoma-nests in the wall of the duct which had developed in the scar-tissue resulting from the passage of gall-stones.

T. Page² reports a case of **hydatid of the gall-bladder**. The symptoms had been very indefinite, the patient occasionally suffering from "bilious attacks." On exploration the gall-bladder was found enlarged and a single hydatid cyst was discovered within it.

Barth³ treated 2 cases of hepatic colic with large quantities of **olive oil**. The pain was relieved at once and the calculi were rapidly discharged. He believes that the oil not only soothes the irritated mucous membrane and relieves spasm in this way, but may even enter the common duct when this is blocked and there is no descending current of bile, and may thus reach the stone and aid in its passage by its local action on the mucous membrane. The ingestion of oil seems to act as a cholagogue also, and this would, of course, aid in the expulsion of the calculi.

DISEASES OF THE PANCREAS.

Klippel⁴ describes the lesions of the pancreas which occur in **infectious diseases**, and which are of two general varieties, the one sclerotic and the other without sclerosis. The former is almost always accompanied by parenchymatous changes, however. The sclerosis may be either perilobular, intralobular, or acinous; with this there is apt to be tumefaction of the epithelial cells, with granular or cloudy degeneration of the cells and perhaps coagulation-necrosis. The parenchymatous lesions occur with acute diseases, such as pneumonia and typhoid fever.

A. R. Edwards⁵ records a case of **acute pancreatitis** which resulted in **recovery**. The man had been without food for some time, and on the day before admission had eaten rather excessively. Some time after, he had severe pain in the epigastrium. The bowels were confined and the abdomen was tender and tympanitic. The diagnosis was, at first, appendicitis, but severe collapse prevented operation. The constipation was so great as to amount to obstruction, and vomiting continued; there were remittent fever, chills, nephritis, and symptoms of pleurisy or of diaphragmatic peritonitis. An acute splenic tumor and enlargement of the lymph-glands suggested an infection. The shock recurred in relapsing form, growing better, then worse; and there was glycosuria. No other affection than acute pancreatitis seemed to explain all these symptoms; but, contrary to the general rule, recovery ensued.

Milnes⁶ records a case of acute pancreatitis followed by recovery. The man had pain in the epigastrium and severe vomiting, with collapse and some fever. The abdomen was concave and extremely tender. There were alternate im-

¹ Wien. klin. Woch., Mar. 31, 1898.

² Med. Week, Dec. 17, 1897.

³ Phila. Med. Jour., Apr. 9, 1898.

⁴ Lancet, Apr. 9, 1898.

⁵ Arch. gén. de Méd., Nov., 1897.

⁶ Lancet, Sept. 11, 1897.

provement and collapse, with constant constipation, but with final recovery. The attacks of collapse did not occur until enemata were administered in the endeavor to produce bowel-movement, and this fact indicates that the bowels should not be disturbed in such attacks. The only condition other than pancreatitis which seemed worthy of consideration was acute peritonitis, either from the passage of gall-stones or from ulceration of the duodenum without perforation, and this seemed excluded by the rapid and complete recovery, the transient character of the attacks of collapse, the absence of melenas or hematemesis, the absence of jaundice, and the fact that gall-stones were not discovered in the stools.

T. Trollope¹ records a **curious case of hemorrhagic pancreatitis**, which began with the usual symptoms, but a swelling appeared in the epigastrium. This swelling seemed pulsatile and a murmur was heard over it. The pulsation created a splashing-sound in the stomach, and with the pulsation a faint expiratory puff was heard at the mouth, which was probably due to pressure on the diaphragm. It was thought to be aneurysm of one of the branches of the celiac axis, but at the postmortem a cavity which contained a pint of blood was found. This was behind the peritoneum and directly at the head of the pancreas. G. H. Weaver² records the case of a healthy man, 31 years of age, who was suddenly taken with severe pain behind the middle of the sternum, radiating to the shoulders and arms. This was not relieved, and the patient became gradually weaker until he died. Postmortem there were found marked hemorrhage into the pancreas and in its neighborhood, and marked sclerosis of the arteries of the pancreas, kidney, and liver. The heart-muscle was pale and flabby, but the coronaries were normal, as was the aorta. The condition of the vessels was thought to be syphilitic. The location of the pain was unusual, and made a diagnosis of hemorrhagic pancreatitis difficult.

M. Simmonds³ records a case in which **fat-necrosis** occurred with hemorrhage into the pancreas. This had been suspected during life because of pain on pressure over the epigastrium, marked meteorism, and the absence of vomiting and fever. Simmonds believes that in fat-necrosis pancreatic changes are primary and not the result of necrosis about the pancreas, and as a proof of this he reports a case in which a gunshot-wound had caused extensive destruction of the pancreas, and at the autopsy, 36 hours later, there was found an extensive fat-necrosis in the abdominal cavity.

H. A. Brennecke⁴ describes 2 cases of **gangrenous pancreatitis with fat-necrosis**. The first case had the usual violent pain, vomiting, and obstipation, with icterus. There was a little albumin, but no sugar, in the urine. Celiotomy was performed and fat-necrosis seen. The patient died, and the pancreas was found gangrenous. The second case was attacked in the usual way, but recovered somewhat, and was seen a month later, when he had pain in the right iliac fossa and weak pulse, vomiting, and signs of effusion in the pericardial and peritoneal cavities. There was obstinate obstipation. Operation was undertaken, and in the peritoneal cavity was found a grayish, turbid fluid containing particles of necrotic matter, and the omentum showed numerous areas of fat-necrosis. The patient died, and at the autopsy gangrene of the pancreas was found. The *Bacillus coli communis* was obtained from some of the organs and from the blood. Both these patients were alcoholics.

W. Polyakoff⁵ records a case of **pancreatic colic** accompanied by glycosuria, which was followed by recovery. The diagnosis was based upon the

¹ Brit. Med. Jour., June 4, 1898.

² Münch. med. Woch., Feb. 8, 1898.

³ Medicine, Nov., 1897.

⁴ Jour. Am. Med. Assoc., June 4, 1898.

⁵ Berlin. klin. Woch., Mar. 14, 1898.

occurrence of pain in the epigastrium, radiating to the left, and tenderness over the pancreas. It was followed by all the signs of diabetes, but treatment relieved the whole condition.

R. Mackenzie¹ describes the case of a woman of 48, who presented the usual symptoms of diabetes mellitus and died in coma. The pancreas was found very much enlarged and contained prominent nodules, the main pancreatic duct, as well as numerous branches, being closed by **concretions**, while the tissue was found very dense and filled with collections of calcium carbonate.

DISORDERS OF THE URINE AND KIDNEYS.

Methods of Examination.—G. Gärtner² has devised a new centrifugal filter for the collection of urinary sediment. He uses a tube, which can be taken apart at its middle, into which a disc of hard filter-paper is inserted. The upper chamber of the tube is then filled with urine, and the tube is put in the machine and centrifugated until all the urine is in the lower chamber. The sediment will then be found on the upper surface of the disc, and may be removed without being washed off in the urine. W. S. Haines and James E. Skinner³ report that the addition of a few grams of chloral to urine, the fluid being then placed in a percolator and allowed to stand over night, will cause the sediment to fall to the bottom, and admits of the greatest accuracy in finding casts and other morphologic elements in the urine.

A. Gluzinski⁴ uses formalin as a **test for bile-pigment**. Added to bile, the latter turns green in 24 hours, or, if boiled, at once. If a mineral acid be added, the color changes to amethyst-violet. He finds that this reaction is due to biliverdin. The test is extremely delicate. From his use of this test he believes that the bile-pigment in the urine in cases of icterus is practically always biliverdin.

A. Krokiewicz and J. Batko⁵ have originated several **tests for the presence of bile**, all of which are based upon Ehrlich's diazo-reaction. They recommend, as the best of these, taking 0.5 c.c. of 1% watery solution of sulphanilic acid and the same amount of a 1% watery solution of sodium nitrite and adding 0.5 c.c. of urine. If then a deep-violet color appears, add distilled water, and then one drop of concentrated HCl; if bile is present, even in minute quantities, an amethyst-blue color is seen within a few minutes. Only bile seems to give this reaction.

F. W. Tunnicliffe and O. Rosenheim⁶ have used a new method for the **quantitative estimation of uric acid**. This depends upon the use of a standard solution of piperidin. They find that 1 c.c. of this solution is sufficient to neutralize 0.0084 gm. of uric acid. Using phenolphthalein as an indicator, they read off the amount of solution necessary to neutralize the uric acid in 100 c.c. of urine. Multiply the number of c.c. used by the above factor, and the amount present in 100 c.c. of urine is obtained. Comparison with Hopkin's method showed that the average difference between the two methods was but 0.2 mg.

R. H. Cook⁷ uses the following method for the **quantitative estimation of uric acid**: 10 c.c. of urine are drawn into a graduated tube and 0.5 dram of sodium carbonate and 1 to 2 c.c. of ammonium-hydrate solution

¹ Montreal Med. Jour., Jan., 1898.

³ Jour. Am. Med. Assoc., June 29, 1898.

⁵ Ibid., Feb. 24, 1898.

² Wien. med. Woch., Mar. 26, 1898.

⁴ Wien. klin. Woch., Dec. 30, 1897.

⁶ Brit. Med. Jour., Feb. 5, 1898.

⁷ Med. Rec., Mar. 12, 1898.

added. The earthy phosphates are removed by the centrifuge, and the remaining clear urine is mixed with 2 c.c. of ammonium hydrate and 2 c.c. of a 0.5% solution of silver nitrate containing ammonia. The precipitated urate is removed by centrifugation, when ammonium hydrate is added, centrifugation is done again, and the minimum reading is obtained: 1 c.c. of precipitate represents 0.001176 gm. of uric acid in 10 c.c. of urine, so that multiplication by 10 of the amount obtained by multiplying with this factor represents the percentage of the uric acid.

H. Richardson and E. L. Whitney¹ describe a **quantitative method** for determining **indican** in the urine: 500 c.c. of filtered urine are taken and HCl and Fe_2Cl_6 added in excess. Boil for one hour, cool, and filter; wash with boiling water, and estimate the nitrogen in the precipitate by Kjeldahl's method. The figure obtained, multiplied by 17.9285, will indicate the amount of potassium-indoxyl sulphate present, and multiplying this by 7 will give the amount of H_2SO_4 in combination with indoxyl.

I. Bang² has devised the following method for the **detection of albumose** in the urine, aiming chiefly to eliminate the urobilin. The urine is boiled with ammonium sulphate and then centrifugated. The sediment is then rubbed with alcohol, which dissolves out the urobilin. He then mixes the sediment with water and filters, the albumose being the only substance now remaining in the filtrate which will respond to the biuret-test. Hematoporphyrin in the rare cases in which it is present will respond, but this may be precipitated in the beginning by barium chlorid.

Stein³ considers **sulphosalicylic acid** the most valuable **reagent for albumin** in urine, since it is extremely delicate, does not redissolve the albumin when in excess, and precipitates mucin and nuclealbumin only when they are present in large quantities.

A. Froehlich⁴ uses **methylene-blue** for the determination of the presence of **glucose** in the urine. To 10 c.c. of urine 5 c.c. of a concentrated neutral lead-acetate solution are added. The mixture is then filtered and 5 c.c. of a strong, filtered watery solution of methylene-blue and 1 c.c. of a 10% sodium-hydrate solution added. The mixture is then heated. If the urine-mixture is added in equal quantity, and sugar be present, the fluid becomes white and then clear yellow.

L. Bremer⁵ has made the following modification of his test for sugar in the urine: he adds gentian-violet in substance to 10 c.c. of diabetic urine, and at the same time adds the stain to a specimen of normal urine. With the urine containing sugar the stain causes the appearance of clouds and stringy formations on the surface, which finally fall to the bottom in clumps and cause a blue-violet discoloration. In normal urine no such formations and discolorations occur. The test is best made at body-temperature. Some urines of low specific gravity which do not contain sugar yield the reaction, and Bremer insists that it is only pathognomonic of glycosuria when the urine is of high specific gravity.

Posner⁶ uses the degree of **transparency** of the urine as a means of approximately determining the **amount of pus**, simply looking through a cylinder filled with the urine, and determining the height of the column necessary to prevent him from reading print placed beneath.

Dufour and Roques de Fursac⁷ have noted that certain individuals who

¹ Jour. Am. Med. Assoc., Apr. 16, 1898.

² Presse méd., No. 46, 1897.

³ Ibid., Apr. 2, 1898.

⁴ Deutsch. med. Woch., Jan. 13, 1898.

⁵ Centralbl. f. innere Med., Jan. 29, 1898.

⁶ Deutsch. med. Woch., No. 40, 1897.

⁷ Bull. de la Soc. anat., May 6, 1898.

had no renal or hepatic trouble eliminate **methylene-blue** in a polycyclic manner. These people are found to have urine of greater density than is usual. While the methylene-blue is eliminated in cyclic manner, it is found that the other solids are eliminated at a constant rate.

Disorders of the Urine.—R. Barlow¹ has made a study of 65 cases of **bacteriuria**, gathered from his own experience and from the reports of others. Sarcinae were most common, being seen in 22 cases. Colon-bacilli were present 19 times, twice with the staphylococci. The latter were found alone in 3 cases, and in 2 cases there were unnamed bacilli, 1 of which produced H_2S . The renal origin of this condition is not yet thoroughly demonstrated, and the author does not consider it probable that the bacteria come from the intestines, as they have not been found in the blood, and in some cases the pelvis of the kidney has been found sterile. There is proof that they do not come from the urethra, because of the character of the bacteria found, and he thinks it probable that infection occurs through lesions of the intestine, such as fissures and fistula about the anus. The seat of multiplication of the bacteria after their entrance is not definitely known. They cause the urine to appear turbid and opalescent and may give it a fetid odor. The sediment consists of bacteria and mucus. The diagnosis is made by examining the urine after it has been passed in several portions. The treatment should be local antiseptics.

Rolleston² reports that after 3 doses of 20 gr. of trional given within a week to a woman with dropsy, jaundice, and dyspnea the urine became deep orange-colored, owing to an excessive quantity of **urobilin**. Death occurred, and there was found empyema, a dilated heart, and a nutmeg-liver. There had been purpuric patches during life, and it is probable that there was urobilinuria before the trional was administered, caused by the purpura and the cirrhotic liver, and this was increased by the use of the drug.

B. Bramwell³ reports a case of **chyluria** in a woman, 66 years of age, born in Mauritius. She had, however, lived in England for 36 years. No filariae could be discovered. She entirely recovered.

E. Stier⁴ records a case of **alkaptonuria** in a boy, 8 years of age, which seemed to have been present from birth. The amount of uric acid was not found reduced, contrary to the results of some other authors. Stier himself ingested 3 gm. of homogentisic acid, and after a few hours again took the same amount in smaller doses. His urine subsequently contained 9.45% of the acid taken, but the uric acid was not diminished. The excretion of homogentisic acid caused some pain in the bladder and urethra, but no other disturbance. He also partially digested meat with pepsin and trypsin, mixed the product with fresh feces, and placed the mixture in an incubator; but no alkapton was produced, so that he believes this substance is not formed in the intestinal canal from the result of microorganismal action.

C. Hirsch⁵ reports a case of alkaptonuria which appeared in a 17-year-old girl after an attack of **febrile gastroenteritis**. The case was remarkable in that the alkapton was present in the urine for 3 days only, and that the blackish tinge of the urine was present even with acid reaction, so that the addition of an alkali did not cause the color to deepen.

T. B. Fitcher⁶ records a case of alkaptonuria, which is particularly interesting because the man had been repeatedly refused life insurance, since he was thought to have diabetes. The urine **reduced Fehling's solution**, first

¹ Deutsch. Arch. f. klin. Med., Band lix., S. 347.

² Ibid., July 31, 1897.

³ Ibid., Oct. 4, 1897.

⁴ Brit. Med. Jour., No. 1890, p. 719, 1897.

⁵ Berlin. klin. Woch., Feb. 28, 1898.

⁶ N. Y. Med. Jour., Jan. 15, 1898.

causing it to turn a dark-brownish color, and later giving an actual reduction; but the fermentation- and phenylhydrazin-tests were negative. The polariscope showed no rotation, and the reducing-substance was determined to be alkapton.

Schulte¹ reports 2 cases of **hematoporphyrinuria**. The first was noteworthy in that it was fatal, and occurred after taking only 1 g. of sulfonal daily for 4 weeks, and in that the hematoporphyrin occasionally disappeared—only to return without evident cause. In the second case the pigment appeared without any definite cause, and with its appearance there were severe constipation, vomiting, and colicky pains. Paresthesia and paresis of the extremities appeared later, but the patient recovered. Urobilin was present in the urine in large quantities in this case. He examined a number of other urines, chiefly from fever-cases (1 from a case of sulphuric-acid poisoning), but found hematoporphyrin in a case of lead-colic only. Keith Campbell² records a case of hematoporphyrinuria in a girl, 22 years of age, who had acute mania. She had taken 30 gr. of sulfonal 3 days before admission, but the urine was not noticed to be red until 14 days after taking this drug. She had vomiting, abdominal pain, and constipation, with progressive paralysis, the diaphragm being almost completely paralyzed. Toward the end she had epileptiform convulsions, which were undoubtedly asphyxial, and death occurred 17 days after admission. The only change of importance found upon postmortem examination was hyaline degeneration of the suprarenal capsules. J. B. Ogden³ records an instance of hematoporphyrinuria in a woman of 38. After an attack of diphtheria she had pain and some loss of sensation in the legs. The anesthesia finally advanced to the waist-line, and was accompanied by loss of control of the sphincters. The hematoporphyrin was present upon but one occasion, and was believed to have been due to the administration of 2 doses of 15 gr. of trional, these doses having been given 11 days and 5 days respectively before the appearance of the pigment. [It seems doubtful, from the report, whether the nervous symptoms were due to diphtheria or were those often seen in connection with hematoporphyrinuria.]

D. F. Harris⁴ describes a substance which is allied to hematoporphyrin, but gives a red color instead of orange. Its spectrum shows 4 bands, 1 each in the red and orange and 1 near the junction between the green and the blue. This substance was found in 2 of his own cases and in 10 others which he collected from the literature. In 5 cases the condition was fatal. In 4 cases large doses of sulfonal had been given. Harris suggests the name **oxyhematoporphyrin**.

W. J. McCardie⁵ gives notes of a case of **oxaluria** in which the chief cause seems to have been eating large quantities of rhubarb, added to a pre-existing tendency to nervous oxaluria. After stopping the rhubarb and giving alkalies early recovery was obtained.

Reynés⁶ has studied the question of the significance of **hypoazaturia**, and concludes that it is distinctly not a positive sign of cancer and has no special diagnostic value. In 90 noncancerous cases he noted 45 in which this sign was obtained; these patients were suffering from various conditions. Hypoazaturia may be either acquired or congenital, and in the latter case the patients have an infantile appearance, are pale, and their superficial circulation and muscular development are imperfect. They can stand but little physical

¹ Deutsch. Arch. f. klin. Med., Band lviii., S. 313.

² Jour. Ment. Sci., Apr., 1898.

³ Brit. Med. Jour., Feb. 5, 1898.

⁴ Sem. méd., July 30, 1897.

⁵ Boston M. and S. Jour., Feb. 24, 1898.

⁶ Ibid., Sept., 1897.

or mental strain. In such instances the condition seems to be renal inadequacy, and treatment should consist in general tonic measures, excluding, however, cold baths. Such subjects bear operation badly, so that the question is of importance in this connection.

Dieulafoy¹ studied a number of cases of renal **hematuria** which were without apparent cause, and reports an instance which occurred in his practice, in a boy 15 years of age. The attacks of hematuria came on without evident cause other than slight exertion. He was unable to work for 2 hours in an erect posture without causing an attack, and sometimes blood appeared when he was at rest. He showed no abnormal physical signs, excepting anemia and weakness. The hematuria was entirely cured after the exhibition of turpentine for two months and a half, and has not recurred up to the present time, 5 years after this treatment. He continues taking small doses of turpentine daily and has excellent health. Luzzato² describes the case of a man, 23 years old, who ascended to a height of 10,000 feet within 5 hours. He was taken with mountain-sickness, and was obliged to descend at once. The next day his urine contained a considerable quantity of blood, but this disappeared after 36 hours. Since the hematuria did not appear until 24 hours after the ascent, it was probably not due to overexertion, but to mechanical or chemical changes. The man had repeatedly ascended mountains before, and had never had any unpleasant results therefrom.

L. Roques³ reports the case of a patient who had for 3 years had a paroxysmal **hemoglobinuria**, which could be produced at will by the application of cold, and upon those portions of the skin to which cold was applied in the form of ice or ether there appeared a circumscribed edema, the fluid of which was always of a yellowish color. The color seemed due to hemoglobin in solution in the transfused serum. There was no symptom of hysteria in the case. L. van't Hoff⁴ reports the case of a girl, 10 years of age, whose mother had had frequent miscarriages, and who since her third year had frequently passed urine that seemed to contain blood. These attacks were frequent in winter, extremely rare in summer. As soon as the patient walked out in cold weather she began to feel uncomfortable, grew sleepy and pale, and had an urticarial skin-eruption. Soon fever and pain in the back appeared and dark-colored urine was passed. In a few days her general condition became good again, a slight degree of icterus commonly remaining for a longer time. Between the attacks she was entirely well, excepting for anemia. She was put in bed for a week and carefully dieted; during this time there was absolutely nothing pathologic in the urine, excepting that after a cold bath she had slight albuminuria. She was then allowed to get up and go out in the cold, and at once had an attack like those previously described. The pigment in the urine gave all the reactions for **hemoglobin**. The resistance of the red blood-corpuscles to sodium-chlorid solution was increased, since they were dissolved by a 0.38% solution instead of the normal solution, which, according to Limbeck, is from 0.46% to 0.48%. There was no hemoglobinemia between the attacks, and coagulation of the blood was normal. The paroxysms seemed dependent upon conditions which commonly give rise to rheumatic attacks.

E. Shultess⁵ has made extensive investigations into the occurrence of **albumosuria**, and has found it in about 14% of cases of illness without fever and is about 90% of cases with fever. It frequently increases or decreases in fever cases in proportion to the height of the temperature.

¹ Jour. de Méd., July 10, 1897.

² Gaz. degli Osped. e delle Clin., May 1, 1898.

³ Soc. méd. des Hôp., Feb. 19, 1898.

⁴ Berlin. klin. Woch., Aug. 23, 1897.

⁵ Deutsch. Arch. f. klin. Med., Band lvi., S. 325.

T. R. Bradshaw¹ reports a case of albumosuria in which the albumose was **spontaneously precipitated**. The urine when passed was turbid, and several times a week there was seen a deposit of a copious white sediment which gave the reactions of albumose. This continued for more than a year. There were kyphosis and immobility of the lower vertebræ, but the exact character of the bone-disease was not known.

Rosin² records the case of a patient in whose urine there was found for many weeks a large amount of a substance giving the reactions for albumose. At autopsy the kidneys were amyloid and fatty, and there was found a round-cell sarcoma, which affected many of the ribs and originated in the marrow. Examination of other cases reported leads Rosin to think that many cases reported as osteomalacia with albumosuria were chiefly instances of **multiple sarcomatosis**.

W. H. Porter³ believes in the existence of a **physiologic albuminuria**, stating that this is due to the ingestion of a greater amount of albumin than the individual can perfectly oxidize; the result being excretion of albumin. Investigations of his cases showed that the habit of overeating is usually associated with this condition, and he thinks that the affection can be controlled by regulating the amount of food ingested.

Ostwald⁴ reported 2 cases of **cyclic albuminuria**, in the first of which there were repeated hemorrhages in the conjunctivæ, and in the second a choroiditis. He believes that the condition is due to abnormalities in metabolism, such as oxaluria. Lacour⁵ found cyclic albuminuria in 3 of a family of 4 children. He does not believe that the condition is evidence of Bright's disease, but thinks that it is gouty in nature. [There was, however, a history of scarlatina in at least 1 of these cases, and the other histories are not clear on this point.]

A. Praetorius⁶ insists upon the fact that albuminuria, particularly cyclic or irregular albuminuria, may be frequently due to **gastrointestinal auto-intoxication**. In one case which he reports hydatid cysts of the liver had caused marked constipation and icterus, and there was also distinct albuminuria; but the latter disappeared after operation upon the cysts and recovery from the disturbed condition of the digestive organs. The function of the liver and that of the thyroid gland are particularly important in such albuminuria, since disturbance of either organ is likely to lead to the production of toxic substances which cause albuminuria.

Crocq⁷ thinks that albuminuria is due to desquamation of the epithelial elements of the kidney, so that he does not believe in the possibility of physiologic albuminuria. [This view does not accord with the opinions of most authorities, as far as the causation of albuminuria is concerned.]

A. Robin,⁸ in considering **dyspeptic albuminuria**, expresses the warning that the simple existence of albuminuria of slight degree in connection with dyspeptic troubles is not sufficient to warrant the diagnosis of dyspeptic albuminuria. He has a strong conviction that these functional and secondary albuminurias are apt to persist, and to result in actual lesions of the kidneys and the development of Bright's disease. In 1584 cases of hypersecretion, he has found albuminuria in 308. The characters which stamp the albuminuria as dyspeptic are: it occurs usually in cases of hypersecretion; the appetite of the patient is increased, while he nevertheless emaciates; his stomach is usually somewhat distended; the liver is commonly enlarged; there

¹ Lancet, p. 1188, Apr. 30, 1898.

² Columbia Med. Jour., vol. xx., No. 4, 1898.

³ Jour. de Méd., July 25, 1897.

⁴ Berlin. klin. Woch., No. 48, 1897.

⁵ Bull. de l'Acad. de Méd., July 6, 1897.

⁶ Berlin. klin. Woch., Apr. 4 and 11, 1898.

⁷ Proc. Internat. Med. Congress, Moscow, 1897.

⁸ Bull. de l'Acad. de Méd., Aug. 17, 1897.

is coprosthesis; and gastric crises are frequent. The quantity of albumin is ordinarily about 0.5 gr., and is entirely serum-albumin; globulin is rarely found. Phosphaturia is frequent. The coefficient of nitrogen-oxidation is increased, and there is often alimentary glycosuria. The albumin is usually present after exertion, but not after rest. Casts are not present, but uric acid and urates are found in large amounts. He treats these cases by putting them at first upon absolute milk-diet, then adding some vegetables, and then returning to ordinary diet, when the albuminuria will usually have disappeared. If there is phosphaturia, acids should be given. If the albuminuria still persists, he gives iron or tannic acid.

B. Symonds,¹ in his work in the examination of the urines of persons applying for life insurance, has reached the following conclusions with regard to distinguishing between **trivial and significant albuminuria**: the longer the albuminuria persists the more probable is its organic origin; continuous albuminuria is more serious than intermittent forms. Tube-casts must be regarded as of serious significance. A persistent low specific gravity is always a grave sign, as is also a hard pulse with accentuation of the aortic second sound. Headaches associated with albuminuria, if at all frequent or severe, are suspicious. An early age is favorable, but an age above 40 suggests renal trouble. Extremes of weight in either direction are signs of gravity, and the use of alcoholics in excess is an unfavorable point in the history.

J. Ranault² discusses **hereditary albuminuria**, and points out that the new-born child of an eclamptic mother may die in convulsions with albuminuria, and hemorrhage may be found in the kidneys after death. He believes that albuminuria also occurs quite frequently in breast-fed children of nephritic mothers, and that there is a form which appears at from 12 to 20 years of age in children of parents with albuminuria, which is due to hereditary renal insufficiency. In some cases it seems due rather to inherited gout, but is then often cyclic. The subjects of the purely hereditary form are pale children, who are dyspeptic and have little muscular energy; the disease tends to increase until, within from 5 to 15 years, they become typical nephritics. The prognosis is therefore bad. [There is considerable ground for the belief that albuminuria may be toxic, and cases of transference from mother to offspring might be explained in this way.] Achard, E. Weill, and Gourdet³ have discovered in the urine of an eclamptic woman with an acute exacerbation of diffuse nephritis, an albumin which was soluble in a slight amount of acetic acid, though this characteristic was but transitory, and after 3 days it again became insoluble. Mercier⁴ has found a similar substance in the urine of eclamptic women.

Nephritis.—Etiology and Pathology.—J. R. Bradford⁵ records some extremely interesting experiments upon the physiology and pathology of the kidneys. Among his results may be mentioned the fact that excision of a portion of the kidney causes hydruria, with, however, a normal amount of urea in the 24 hours. This always follows if as much as one-third of the kidney is left. If more than this is taken away, the urea becomes greatly increased, the animal emaciates, the temperature falls, and death commonly occurs within a short time. Bradford considers that this increase in urea comes from the muscles. The blood in fatal cases contains an excess of nitrogen-extractives, particularly of urea, and the same is true of the liver and the muscles. Bilateral nephrectomy causes marked fall in temperature, and

¹ Am. Jour. Med. Sci., Apr., 1898.

² Jour. de Méd., Oct. 25, 1897.

³ Gaz. hebdom. de Méd. et de Chir., Dec. 23, 1897.

⁴ Med. Week, p. 385, 1897.

⁵ Lancet, Mar. 19 and 26, 1898.

death, without vomiting or other symptoms of uremia. Ligation of both ureters causes similar symptoms. Ligation of one ureter causes excretion from the corresponding kidney of a clear fluid which contains no urea; and the epithelium of the convoluted tubules, when examined, shows a homogeneous, hyaline appearance. The author decides from his experiments that any internal secretion from the kidneys is improbable. After bilateral nephrectomy or bilateral ligation of the ureters there was evidence of increased tissue-destruction, and in the blood-examinations he has found urea and extractives much increased in obstructive suppression of urine, while the increase in acute uremia is even greater; but in uremia with chronic disease of the kidneys there is less increase, and in puerperal eclampsia there is but slight excess.

Le Gendre¹ discusses the **influence of the menopause** upon the kidneys. He has frequently observed renal congestion and diminution in the quantity of urine, particularly in women of a neuroarthritic temperament. There may be more severe symptoms, such as hematuria, lumbar pains, vomiting, or intense headache. They are, he thinks, probably due to auto-intoxication.

Ferrio and Bossio² have investigated the effects of experimental **intestinal occlusion** upon the kidneys. Death occurred in from 3 to 6 weeks after the operation. The changes in the urine were usually slight and unimportant. Examination of the kidneys showed that no bacteria were present, even when animals were killed soon after the operation, unless peritonitis had occurred, when bacteria were present. The kidney showed histologic changes within 3 days after the occlusion. These affected the epithelium of the convoluted tubules and caused the appearance of necrosis. This was considered due to toxic causes.

Pawlinow³ contends that there is a **chronic scarlatinal nephritis**, which usually makes itself evident at from 21 to 24 years of age, arising slowly and insidiously and lasting for years—the parenchymatous form for 5 years or more; the interstitial form as long as 15 years. The author has within 6 months observed 3 such cases.

Symptoms.—L. A. W. Alleman⁴ states that a suspicion of nephritis should always be aroused by the occurrence of intractable conjunctival irritation without definite cause. Sudden ocular paralysis should also arouse suspicion.

A. T. Wilkinson⁵ discusses the **vis medicatrix naturæ** in diseases of the kidneys, pointing out that the increase in arterial tension is a conservative process intended to increase excretion, and its occurrence must indicate to the physician the necessity for aiding excretion. If this high tension is insufficient to get rid of the watery and excretory elements of the urine, nature proceeds by causing dropsy, which is a favorable occurrence in most of such cases as long as it does not affect vital organs, such as the lungs, relieving the kidneys and temporarily preventing overloading of the organism with excretory products. The first heart-change is hypertrophy, which is compensatory, so that all the changes are not simply pathologic lesions, but are means to certain ends. Wilkinson insists upon his belief that scarlet fever has an extremely important rôle in the causation of renal fibrosis. The symptoms apparently disappear very early after the disease, but persistence of some fibrous change is always to be expected.

W. Rose⁶ records an interesting case of nephritis. The patient suddenly

¹ Soc. méd. des Hôp., Dec. 10, 1897.

² Proc. Internat. Med. Congress, Moscow, 1897.

³ Lancet, Dec. 11, 1897.

⁴ Lo Sperimentale, No. 2.

⁵ Brooklyn Med. Jour., Dec., 1897.

⁶ Berlin. klin. Woch., Feb. 28, 1898.

became **monophasic**, and could say nothing but "ja"; soon after, uremic convulsions came on. After the uremia had been controlled the aphasia passed off. Rose considers the cause of uremic aphasia probably a circulatory disturbance in the neighborhood of the middle cerebral artery. Ughetti,¹ from his experimental work (tying the ureters), has reached the conclusion that the fever which sometimes occurs in uremia is not a direct symptom of uremia, but is due to accidental complications or to the convulsive attacks.

Achard and Castaigne² have found that the **renal permeability** to methylene-blue is normal so long as the kidney is purely a cardiac kidney; while in chronic nephritis one finds the urine abundant in amount, perhaps, but poor in urea, phosphates, and chlorids, and there is distinct evidence of lessened permeability to methylene-blue. They find that this degree of permeability is of considerable prognostic value, and insist that the amount of the urine and the permeability of the kidney must be kept entirely distinct in making the diagnosis or prognosis.

J. R. Bradford³ records a series of 6 cases of **chronic nephritis**, all of which occurred **in young women** and presented somewhat peculiar symptoms. The subjects had headache, backache, and vomiting, and symptoms of uremia often occurred rapidly. Death followed within a few weeks after the first symptoms. Edema was seen in only 1 case, as was albuminuric retinitis. The specific gravity of the urine was low, but there were a good deal of albumin and a lessened quantity of urea. The kidneys were found somewhat granular and were small, but the capsules stripped readily. Bradford considers this a peculiar but special form of nephritis. [The duration of the disease in these cases must be considered unsettled. The changes found in the kidneys indicate a longer course than that suggested by the clinical symptoms.]

D. D. Stewart⁴ uses a case as a text for some observations upon a **form of nephritis** which he believes has been **hitherto undescribed**. It is characterized by oliguria, concentration of the urine, absence of dropsy and of cardiac debility, and presence of casts, with absence of albumin and diminution in the amount of urea. Uremic symptoms may be slight or, as in his case, severe. [The amount of urea excreted must be considered in connection with diet and gastrointestinal conditions. As an isolated fact, increase or decrease of urea is probably of little significance in indicating renal disease or any other disorder.]

A. T. Wilkinson⁵ discusses the **senile kidney**, which he considers is not a chronic nephritis, but is due to renal failure in advanced age, owing to excessive eating or drinking, so that the kidney, while not strictly diseased, has become unable to perform the work that it has previously done. It may give rise to all the uremic symptoms of nephritis, though the prognosis is more favorable. The organ is somewhat fibrous, but not as a result of inflammation. The failure in the function of the kidney causes the blood-pressure to rise, and this causes hyperplasia of the connective tissue of the organ. This condition should be treated by limitation of alcoholic drinks, or their entire exclusion, and by suitable diet, together with the use of purgatives.

Treatment.—R. C. Kemp⁶ has investigated in experiments upon dogs the effect and practical value of **irrigation of the large intestine** with water at various temperatures, and finds that if one wishes to increase blood-pressure, this can be successfully done by raising the temperature of the irrigation-fluid to 105° or 110° F. Even greater effect is produced by using water

¹ Proc. Internat. Med. Congress, Moscow, 1897.

² Practitioner, Apr., 1898.

³ Ibid., June 4, 1898.

⁴ Soc. méd. des Hôp., Jan. 14, 1898.

⁵ Lancet, Sept. 4, 1897.

⁶ N. Y. Med. Jour., June 29, 1898.

at 110° to 120° F., and this also stimulates the heart. Irrigation with normal salt solution was very successful. Ice-water reduces the temperature, but is depressing. Hot water causes an increase in temperature. The effect upon diuresis was in direct proportion to the effect upon the blood-pressure, though absorption of water from the intestine also increases diuresis. Hypodermoclysis increased renal secretion in 4 minutes, while irrigations acted only after about 10 to 20 minutes, but irrigation can be more readily applied.

G. Diebella and G. V. Illyés¹ brought 3 individuals with chronic nephritis into a condition of nitrogen-equilibrium, and then administered **thyroid extract** in large amounts. This produced diuresis and increased the elimination of nitrogen, and the amount of albumin in the urine became less. This continued for 4 or 5 days after the thyroid extract had been stopped, but then the previous condition reappeared. The authors explain the decrease in albumin in the urine by assuming that the increased amount of urea was formed at the expense of the albumin in the blood.

Liégeois² does not consider the drugs commonly used of much value in the treatment of acute nephritis, but prefers the use of **tannin** in doses as large as 30 g. a day. He claims that this drug, by its astringent action upon the renal epithelium, relieves congestion and allows free circulation in the kidneys, and prevents exudation. After the acute stage is passed he uses theobromin in connection with tannin.

Dreschfeld³ recommends **diuretin**, particularly in acute Bright's disease. He has seen it cause the urine to increase from 12 oz. to 100 oz. in 24 hours. It is not so satisfactory in post-scarlatinal nephritis or in chronic parenchymatous nephritis, and there was little effect in interstitial nephritis. He has found it of value in heart-disease, and its effect in cirrhosis of the liver was sometimes extremely marked. [We have found this remedy very useful in some cases, though it occasionally produces headache and other unpleasant symptoms.]

Strauss⁴ has used **urea** in doses of from 10 to 20 gm. daily, and finds that in cases in which the kidneys are intact there is an increase in the excretion of urine. In a case of chronic nephritis it had no such effect. He saw no unpleasant effects of its use. He also found that increasing the excretion of urea by administering ammonia causes a considerable increase in the diuresis. Titian⁵ has had experience in the use of urea as a diuretic. No ill-effects were noticed, excepting slight diarrhea in 1 case. Fourteen cases were treated, including cirrhosis of the liver, serous pleurisy, cardiac weakness from empyema and from myocarditis, interstitial nephritis, and 5 healthy persons. He noticed no diuretic action in any case when administering the drug in doses as large as 1 oz. a day, and concludes that it is of little value as a diuretic.

Mole⁶ administered **extract of kidneys** to healthy rabbits upon which a unilateral nephrectomy had been done. No marked effect was produced unless more than 5 c.c. were injected, when there were albuminuria, sometimes hemoglobinuria, and disturbance in the amount of urea excreted. The author believes that renal extract has no distinct therapeutic value.

Huchard⁷ recommends the use of **lavage** in the vomiting of uremia, both for the purpose of removing the poison and in order to make it possible to administer proper medicines by the stomach.

R. Fruteau⁸ presents a study of the **alimentation to be used in chronic albuminuria**, and concludes that milk-diet with some bread gives the least

¹ Arch. f. exper. Path. u. Pharmacol., vol. xxxix., p. 273.

² Jour. des Prat., No. 46, 1897.

³ Lancet, June 11, 1898.

⁴ Charité Annalen, xxi., Jahrgang.

⁵ Therap. Monatsh., Mar., 1898.

⁶ La Clinica moderna, Dec. 1, 1898.

⁷ Jour. des Prat., Dec. 25, 1897.

⁸ Thèse de Paris, 1898.

quantity of albumin in the urine. The addition of eggs and weak wine furnishes the next most suitable diet. The latter diet is better than that composed of milk and vegetables, and the addition of meat is better than giving vegetables. Fish, vegetables, and wine together cause excretion of greatest amounts of albumin. Of all meats, beef and veal are best tolerated. Chicken, mutton, and bouillon increase the waste of albumin. The carbohydrates to be used are rice, potatoes, and cabbage, the former being best of all.

J. H. Musser,¹ in his experience, has found **renal calculus** almost exclusively confined to the middle period of life. The pain of calculus may resemble that of appendicitis, but it is more paroxysmal and of less uniform location. Contrary to the views of others, he has found that pain is more frequent during the day than at night. The urine of 20 of the 40 cases which he records was studied repeatedly by centrifugation, and blood was present in every instance. He considers this the only constant symptom of the affection. Pus was generally absent, while albumin was frequently present in small quantities. Hyaline casts were nearly always found.

Strauss² is convinced from his experiments that **calcium carbonate** is a useful drug in the treatment of **nephrolithiasis**, since he found that its use caused considerable diminution of the phosphates without making the urine alkaline. If the urine became alkaline there would be danger of the formation of calcium calculi. There was no evident diuretic action and the nitrogen-excretion was not markedly influenced.

L. Casper³ finds that **urotropin** cuts short attacks of renal colic and postpones recurrence. He also finds it useful in phosphaturia in doses of 15 to 30 gr., and in cystitis and pyelitis it is a useful disinfectant, as also in cases of ammoniacal urine. This is due to the fact that formaldehyd is set free during its decomposition.

M. Mendelsohn⁴ divides **diseases of the upper urinary passages** into two forms: those in which there is infection of the tissues themselves and those in which there is simply infection of the urine. The first form shows chiefly catarrhal conditions of the urine, and is best treated by such drugs as sandalwood-oil, balsam of Peru, and the like; thus first curing the catarrh. In case the urine is infected, the best results are obtained from the use of salol or urotropin; the latter being especially recommended. The author also insists upon the advisability of the use of a large amount of water; he considers this the most important matter in the treatment of renal calculi also, though alkaline diuretics and lithium salts aid in the treatment of stone.

Bovet and Huchard⁵ advise the treatment of **infectious pyelonephritis** by hypodermoclysis of salt solution, giving as much as 2 liters in the day, and using at the same time large amounts by the rectum. Such excessive quantities can be administered for a number of days without ill-effects.

Moncorva⁶ treats **chyluria** with ichthyol, giving daily doses of from 7 to 30 gr. administered in pill-form. In 2 cases he seemed to have effected a cure.

D. Newman⁷ reports 5 cases of **movable kidney** in which attacks of **transitional hydronephrosis** occurred. With these there were severe pain and total suppression of the urine. All were cured by suturing the kidney in its proper position.

T. Oliver⁸ reports a case in which severe abdominal pain and **tumor** caused

¹ Phila. Med. Jour., Apr. 10, 1898.

² Therap. Monatsh., No. 52, 1897.

³ Jour. de Méd. de Bordeaux, Nov. 7, 1897.

⁴ Brit. Med. Jour., vol. ii., p. 971, 1897.

⁵ Zeit. f. klin. Med., xxx., 56, 1897.

⁶ Berlin. klin. Woch., Jan. 17, 1898.

⁷ Nouveaux Remèdes, No. 23, 1897.

⁸ Ibid., Feb. 26, 1898.

operation for suspected malignant disease, but after opening the abdomen a **horseshoe-kidney** was discovered, and no other disease.

J. D. Steele¹ records the case of a woman of 23 years with **tuberculosis of the kidney**. She had a large mass beneath the liver on the right side, which was not painful, and which was associated with albumin and pus in the urine. Blood was absent. Postmortem there was tuberculosis of the lungs and of the right kidney, the cortex showing numerous spots of caseous degeneration, while the pyramids were largely converted into clumps of cheesy material. Microscopically the picture of tuberculosis was seen, though bacilli were not found. He divides cases of renal tuberculosis into those which occur as part of a general eruption of tubercle; those in which the process is primary, occurring either in the kidney alone or being evidently older there; and those in which the primary seat of the disease is in doubt, but the manifestation in the kidney is most intense. His case belonged to the latter category.

Cooper and Kelynaek² describe the case of a man, 52 years of age, who had for a long time been ill with vomiting, pains in the distribution of the right lumbar plexus, wasting, and hematuria; the right kidney was palpable and much enlarged. After death the right kidney was found of large size, firmly bound down, and very fibrous, and showed microscopically the appearance of **syphilitic sclerosis**. There was also found a gumma of the liver.

Allen and Cherry³ have examined 29 cases of **primary renal tumors**, and believe that all originate in the renal tubules, and not in inclusions from the suprarenals or Wolffian ducts. In metastasis the secondary growths were always of a sarcomatous type, even when the primary tumor seemed to be a carcinoma. The tumors of slow growth were commonly those of the combined form, while those that grew rapidly were of simple structure.

Engelsh⁴ observed **incontinence of urine** in a man, 25 years of age, who had recently recovered from diphtheria; he attributes the incontinence to diphtheritic paralysis of the bladder.

P. Thorndike⁵ reports a case of **cystin-calculus** in the male bladder. A characteristic symptom was the presence of hydrogen sulphid in the urine. It was interesting that cystin-crystals were absent from the urine. In the same journal J. B. Ogden reports that his analysis of this calculus showed that it had a slight external coat of ammonio-magnesium phosphate, but the remainder was composed solely of cystin-crystals.

PARASITES.

H. Malherbe⁶ records the case of a woman of 23, who had an inflammatory swelling on the shoulder. Upon incising, a **Distoma hepaticum** was found in the contents.

Skaller⁷ records a case in which he found the **Trichomonas vaginalis** in the stools. The patient had a stricture of the esophagus, and the food had stagnated behind the stricture. Skaller believes that the parasites developed in the dilated esophagus. Although the patient had diarrhea, the number of these organisms did not run parallel with the severity of the diarrhea; the bowel-disturbance seemed due to the entrance into the intestine of food which had lain in the esophagus and had partially putrefied. Examination of the literature convinced the author that in the cases in which these parasites were

¹ Jour. Am. Med. Assoc., Aug. 14, 1897.

² Brit. Med. Jour., vol. ii., p. 800, 1897.

³ Proc. Intercol. Med. Congress of Australia, 1897.

⁴ Wien. med. Presse, No. 9, 1898.

⁵ Boston M. and S. Jour., Apr. 21, 1898.

⁶ Progrès méd., Jan. 22, 1898.

⁷ Berlin. klin. Woch., June 20, 1898.

found present they had no definite influence upon any existing diarrhea, and they have been found in perfectly healthy persons.

P. Mégnin¹ describes and pictures an insect which is found on an island in the Indian Ocean, and which often causes poisoning, particularly in children, who are apt to carry the eggs to their mouths. The symptoms consist chiefly of severe inflammation of the mucous membranes, with edema of the pharynx which may progress to death. The insect seems to be the **Holothyrus coccinella** (Gervais).

Lauenstein² has found the **Leydenia gemmipara**, Schaudin, in the ascitic fluid of a woman who had carcinoma of the peritoneum. [This, it may be recalled, is the protozoan organism first discovered by Leyden in the ascitic liquid of a case similar to the above.]

Laboulbène and Dubois³ report the case of a man who had incessant vomiting for 15 days, which ceased a few hours after the expectoration of a **Gammarus pulex**.

Bachmann⁴ records the case of an alcoholic who vomited frequently, and who found the **larvæ of flies** in his vomit. After the administration of Persian insect-powder large numbers of these larvæ were found in the stools, and all symptoms vanished. [This is a new form of treatment. The powder is said to be harmless to man.]

H. Hensen⁵ reports that he found certain **peculiar infusoria** in the stomach-contents from a case of gastric carcinoma. These organisms were round or ovoid, and varied from 5 to 15 μ in size, were usually granular, and sometimes seemed to contain vacuoles. They had one or more cilia, and were very motile. They had no evident relation to the cancer-tissue.

O. Voit⁶ reports 3 new instances of **Balantidium coli** found in the intestines or stools of human beings. Postmortem there was found in one case severe ulceration of the entire large intestine. The patient had died of perforative peritonitis. In the other fatal case no balantidia were found in the intestine, but the mucous membrane showed small hemorrhages and minute abrasions. The symptoms in these cases had been frequent bowel-movements and pain in the abdomen, with progressive emaciation and weakness, loss of hemoglobin, and profound cachexia. The stools improved at times when the parasites were present in smaller numbers, but no medication seemed to have any effect. The best treatment seemed to be the use of boric-acid irrigations, with the internal administration of cin. The lesions in the intestines and the situation in which the parasites were found were identical, and from this and the clinical variations, which seemed to depend upon the number of parasites, the author concludes that the lesions were due to the direct effect of the parasites. It must be recognized that the parasites may be acquired from swine. One of the patients had killed a number of hogs shortly before his illness began, and another had had the care of cows. [The pathogenicity of the organism cannot so readily be proved. Many of the organisms of this class seem to be purely saprophytic, and the same role not improbably belongs to this one.]

G. Lamb⁷ has found that injection of bichlorid of mercury along the tract of the **guinea-worm** kills the worm, which is subsequently absorbed, thus shortening the treatment and making it much more effectual.

J. Trumbull⁸ accidentally discovered a nematoid worm and its eggs in the

¹ Bull. de l'Acad. de Méd., Aug. 24, 1897.

² Bull. de l'Acad. de Méd., Jan. 4, 1898.

³ Deutsch. Arch. f. klin. Med., Dec. 9, 1897.

⁴ Brit. Med. Jour., Mar. 12, 1898.

⁵ Deutsch. med. Woch., No. 46, 1897.

⁶ Deutsch. med. Woch., Mar. 24, 1898.

⁷ Ibid., June 16, 1898.

⁸ Med. Rec., Aug. 31, 1897.

urine of a man with symptoms of angina pectoris. This worm he identified as the **Eustrongylus gigas**. C. W. Stiles¹ gives an elaborate description of the *Eustrongylus gigas*, and presents his reasons for believing that the case previously reported by Trumbull was not this parasite. G. W. Moorehouse² records the case of a man of 58 years, who had had renal colic with hematuria. He subsequently passed through the urethra a worm nearly a foot long, and has since been known to pass 55 similar worms which were from an inch to a foot in length. The worm was supposed to have been the *Eustrongylus gigas*. R. J. Allen³ records a case of profound recurring hematuria in a man, 87 years of age, in whose urine was found a worm $5\frac{1}{2}$ in. long, which he believes he has identified as the *Eustrongylus gigas*.

Strube⁴ found 3 parasites in a negro from the Transvaal. One parasite was the **Bilharzia**, another the larva of the **Filaria sanguinis hominis**, and the third was of an unknown species. All these seemed endemic among the people of that region, as they were found in most of 20 others from the Transvaal who were with this individual in Berlin.

Patrick Manson⁵ describes what he believes is a **new species of filaria**. In examining the blood of aboriginal Guiana Indians residing in the interior of British Guiana, he found among 63 cases no example of *Filaria nocturna*, but in 27 many specimens of two forms of minute filarie entirely different from the more familiar varieties. One of these resembled the *Filaria Demarquayi* of St. Vincent's, being minute, sharp-tailed, and without a sheath; the other closely resembled, if it was not identical with, the *Filaria perstans*, a parasite which he had found hitherto only in West African blood. The two forms were found side by side on the same slide. His discovery was confirmed by Ozzard and Daniels in other cases. He believes that the blunt form is identical with the *Filaria perstans* of West Africa. The other form he regards as a new variety and terms it "*Filaria Ozzardi*." At the present time it is probable, therefore, that 6 varieties of minute nematodes inhabit the blood of man—viz., the *Filaria nocturna*, diurna, perstans, Demarquayi, Megalhesi, and this new form *F. Ozzardi*. The author advises the following method for studying the blood: express a large, full drop by pricking the finger; transfer it to a slide cleansed with alcohol; spread out the blood with a needle over a surface about 1 in. square. After the blood has dried wash out the hemoglobin by passing through water 3 or 4 times, or, if the slides are old, through water containing a drop of acetic acid to the ounce. Then dry, fix in absolute alcohol for 5 to 10 minutes, and stain in methylene-blue.

F. J. Crawford⁶ describes 2 cases of **filarial disease** which were **operated upon**, in 1 case several times, first opening the chylous hydrocele, and subsequently the inguinal glands, first on one side, then on the other. Both cases were much improved by this treatment; and although it can be but temporary in its effects, the author recommends that operation be used because of the relief that follows for a time.

Mertens⁷ describes 2 cases in which he found **round worms in the biliary passages**. In 1 case there was icterus, with fever and severe colic, followed by enlargement of the liver, ascites, and dropsy of the lower extremities; he was led to suspect a tumor in the fissure of the liver causing pressure, but all symptoms disappeared after 2 round worms were passed. In another case presenting symptoms of gastric carcinoma, with secondary involve-

¹ Med. Rec., Apr. 2, 1898.

² Austral. Med. Gaz.

³ Brit. Med. Jour., Dec. 25, 1897.

⁴ Jour. Am. Med. Assoc., Mar. 26, 1898.

⁵ Deutsch. med. Woch., 1897.

⁶ Lancet, June 11, 1898.

⁷ Deutsch. med. Woch., June 9, 1898.

ment of the liver, these lesions were found after death; but a round worm was likewise found, partly obstructing the common bile-duct.

E. Peiper¹ discusses the symptoms which may be due to intestinal parasites, and reports a case in which a condition resembling meningitis disappeared almost at once after a number of round worms were expelled. He believes that the parasites themselves produce poisons, and that these cause the symptoms. That they do contain poisons has been proved by previous investigations. The infrequency of severe toxic symptoms in these cases is perhaps due to the long duration of the disease and the small number and slight activity of the parasites which are present.

P. Marie² records a case of the **typhoidal form of lumbricosis**. Although recoveries have occurred in all instances of this affection reported, Marie does not believe that it is without danger, but considers that in some cases that are fatal the cause of death is unrecognized. They are apt to resemble typhoid fever very strongly. His own case had typhoidal symptoms for at least a month, and got no better on quinin or other treatment until the administration of calomel caused the expulsion of an ascaris. Santonin was given and a second worm was passed; and although further doses brought no other parasites to light, they did cause a striking reduction of temperature, which was, he believes, produced by the effect of the drug upon the worms in limiting their poisonous action; for he considers that these parasites cause toxic symptoms either by increasing the virulence of the microorganisms in the intestine or by a poison produced by themselves, the existence of which is proved by injecting guinea-pigs with the juice of lumbricoid worms. [Should the view that intestinal worms cause symptoms by intoxication prove correct, and there is much in its favor, it does not seem likely that such intoxication is necessary or habitual.] Muscocci³ reports a case in which there were severe vomiting and dyspnea, followed by convulsions. A long lumbricoid worm was removed from the trachea, but after a brief improvement the woman died, and the left bronchus was found obstructed by a large living ascaris.

P. Apostolides⁴ records 2 cases in which an ascaris perforated the intestine. In the first case the man died from purulent peritonitis within 24 hours. In the second case death occurred 4 days after the probable perforation. At autopsy purulent peritonitis was found in both cases. Laveran⁵ reports upon the work of Matignon, who notes that the *Oxyuris vermicularis* is extremely common in children in China; the ascaris also is found in nearly 98 % of all children. Native adults are the hosts almost as frequently as children. Europeans living in Pekin are affected by the ascaris in a proportion of only about 25 in 100. Evil hygienic conditions explain the great prevalence among the Chinese. Contrary to the facts related regarding the ascaris, tenia is much more common in Europeans in Pekin than in the Chinese; 70 Europeans showed the presence of tenia in 16 instances, while during the same time he saw it in only 2 or 3 Chinese; and of 25 natives, chosen by chance, none showed tenia after the administration of anthelmintics. Laveran, however, states that this method is not sufficient to prove the relative frequency of the tenia in the natives and in Europeans, since the parasite may have been present and not affected by the vermifuge.

C. W. Stiles⁶ has collected 1063 cases of **tapeworm**, and studied their occurrence in the two sexes. Four hundred and two cases occurred in males,

¹ Deutsch. med. Woch., No. 48, 1897.

² Riforma Med., vol. I., p. 124, 1898.

³ Bull. de l'Acad. de Méd., Sept. 21, 1897.

⁴ Jour. des Prat., Nov. 6, 1897.

⁵ Lancet, Mar. 7, 1898.

⁶ Med. Rec., Oct. 23, 1897.

so that it is not at all rare in this sex. That women more frequently acquire it is due, he believes, to the fact that they more frequently prepare food for the table. Of the specimens sent to the Bureau of Animal Industry, the *Tænia saginata* is by far the most common, the solium being much less common, while he has seen but 3 cases of *Bothriocephalus latus* in the United States, 1 of *Tænia flavopunctata*, and 1 of *Tænia confusa*. To prevent breaking up the worm the stools should be passed into warm water. His experience in personal experimental infection with tapeworm was that he had frequently, as the most common symptom, a sensation like that felt upon the sudden descent of an elevator.

T. Shennan¹ gives a description of some segments of a *Tænia saginata*, which upon microscopic investigation showed a division of the segments opposite the genital pore, thus giving to each segment a **triradiate** appearance.

De la Fuente² considers that two symptoms are diagnostic of intestinal worms, one being the occurrence of attacks of colic and the other bilateral narrowing of the visual field.

Hobday,³ after experimental work with **tenalin**, a preparation made from the areca-nut, states that it usually causes expulsion of the head of tapeworms as well as the segments. He considers it safe, and administers it in doses of 1 minim for each pound of body-weight. Rieapet⁴ uses **arecolin**, the alkaloid of the areca-nut, as a teniacide, and considers it of marked value. E. C. Chamberlin⁵ has had good results by treating tapeworms with a combination of chloroform, turpentine, and male fern. Sandwith⁶ has had success with the use of thymol in ancylostomiasis. One patient had been ill 12 years, and 1 dose of thymol caused the expulsion of 523 ancylostomas. W. S. Thayer⁷ found remarkable increase of the eosinophile leukocytes in 2 cases of trichinosis. In the first case the eosinophiles, upon differential count, reached 68.2% of the total number of leukocytes, the polynuclear neutrophiles being reduced at one time to 6.6%, and being absolutely decreased even when the leukocytosis reached 30,000 per c.mm. The leukocytes were even more largely increased in sections from muscles than they were in the circulating blood. Among these wandering cells in the tissues were some that had peculiar characteristics of their nuclei and granules, which suggested that they were transitional in form between the polynuclear neutrophiles and the eosinophiles, thus indicating that the latter are derived from the former. In the second case the diagnosis was obscure, and trichinosis was first suggested by the increase in the eosinophiles. In both cases the diagnosis was confirmed by examining excised portions of the muscles.

T. R. Brown⁸ describes 2 cases of **trichinosis** in which there was a remarkable **increase in the number of the eosinophilic cells**. In 1 case this was so great that they comprised 68.2% of all the leukocytes. Pieces of excised muscle showed marked proliferation of the cells, with formation of vacuoles about the nuclei, and granular degeneration of the muscle-fibers; but, most important, it showed the presence of a very large number of eosinophilic cells, and this would suggest that the eosinophiles were formed from the neutrophiles, and perhaps in the muscles, since the increase of the former occurred at the expense of the latter, and transitional forms were found in one piece of muscle, and in a second piece, examined 2 weeks later, the

¹ Scottish M. & S. Jour., May, 1898.

³ Jour. Compar. Path. and Therap., Dec., 1897.

⁵ Med. Rec., Aug. 28, 1897.

⁷ Ibid., Sept. 25, 1897.

² Presse méd.

⁴ Jour. de Méd. de Paris, Aug. 1, 1897.

⁶ Lancet, Sept. 11, 1897.

⁸ Jour. Exper. Med., May, 1898.

eosinophiles were found very largely increased. W. S. Thayer¹ records a third case of trichinosis, in which the eosinophile cells were increased to a remarkable degree—in this case to 45%. The polymuclear neutrophiles were relatively reduced to 48.2%, though the whole number of leukocytes in a c.mm. was 34,000. Thayer believes that he is justified in asserting that this enormous increase in the eosinophiles at the expense of the polymorphonuclear neutrophiles is so constant a feature of trichinosis as to be a very important sign of the disease.

R. C. Cabot,² upon examining the blood of a patient without any distinctly recognized disease, found a marked increase of the eosinophile leukocytes, which made him suspect trichinosis. This, he found later, had been suspected by a previous physician also, but no diagnosis of the condition was established.

F. A. Packard³ records a case of trichinosis occurring in a man, 28 years of age, a farm-hand by occupation. The illness began by vomiting, and swelling of the face. There were pains which did not correspond to nerve-trunks, blood-vessels, or bone in the limbs but were most severe toward the ends of the muscles. There was some high temperature of irregular course. The respirations were constantly increased. There was no leukocytosis. There were marked insomnia, thirst, and sweating. No history of eating raw pork was elicited. Examination of a piece of the gastrocnemius showed a number of living nonencapsulated embryonal trichinae. Packard emphasizes the diagnostic importance of rapidity of respiration without evident cause. He has personally seen 3 other cases of trichinosis, and has collected reports of 357 cases in the United States and Canada, in which the mortality was 24.07%.

A. Posselt,⁴ after an elaborate study of the occurrence of the **echinococcus in the Tyrol**, reaches the conclusions that this district should be added to those in which the *Echinococcus multilocularis* is recognized as occurring with great frequency, and, in fact, when the small number of inhabitants in this region is considered, this seems to be the place of greatest infection. There are two parts of the Tyrol in which the *echinococcus* is found with especial frequency; one of them being the wedge-shaped piece of country between Bavaria and Salzburg, and the other the country round about Mühlbach. The hydatid form of the *echinococcus* is quite rare in the Tyrol, but the 2 forms appear to be met with frequently in certain definite geographical regions. In general, the multilocular form is far more common, and this form, up to the present, has been found only in country peasants. From a study of other writings it seems probable that the *echinococcus* is becoming rarer in Switzerland, Bavaria, and Wurtemberg, while it is probably increasing in frequency in the Tyrol.

Railliet and Morot⁵ note that multilocular *echinococcus* has been thought to be indigenous to certain countries only, and entirely foreign to France, even in cattle. They state, however, that they have seen it repeatedly in cattle in France, and they present a report of a case.

CLINICAL USE OF THE RÖNTGEN RAYS.

P. M. Jones⁶ has noticed that **X-ray dermatitis** is more apt to ensue from exposure to low-vacuum tubes. To prevent it, high-vacuum tubes and the minimum exposure necessary to produce satisfactory results and to allow keeping the tube at least 6 in. from the patient, should be used. He believes

¹ Phila. Med. Jour., Apr. 9, 1898.

² Jour. Am. Med. Assoc., July 10, 1897.

³ Bull. de l'Acad. de Méd., Apr. 19, 1898.

⁴ Boston M. and S. Jour., Dec. 3, 1897.

⁵ Deutsch. Arch. f. klin. Med., Oct., 1897.

⁶ Jour. Am. Med. Assoc., Nov. 6, 1897.

the dermatitis is due simply to absorption by the cells of the skin of radiant energy from the tube.

Maragliano¹ gives a description of the normal **radioscopic appearances of the lungs and heart**. The transparency of healthy lung-tissue is seen better posteriorly than anteriorly. The movements of the heart were observed, and the apex was seen to be elevated during systole, though the heart did not change its position at this period, and no rotation could be observed. When a deep inspiration was taken the cardia was narrowed transversely and lengthened at the lower part, so that the heart evidently became more vertical at this time, and the fulness of the ventricular pulsation was also lessened. The heart-area, as determined by percussion, is found to correspond with that determined by radioscopy. He thinks that radioscopy will be of importance in the diagnosis of disease. In a young girl who showed no physical signs of tuberculosis he found a very slight area of opacity at the left apex, and an injection of tuberculin gave a characteristic reaction. Radioscopy is also of value in differentiating between pleural affections and diseases below the diaphragm, and likewise in the diagnosis of aneurysms.

Bergonié and Carrière² have been able to observe with the fluoroscope **displacement of pleuritic fluid** when the patient changed his position, and also with the movements of the diaphragm. Purulent effusions were less opaque than serous, and the fluoroscope helped to reveal tuberculous changes in the lung above the effusions.

H. Schlessinger³ records his examination with the aid of the fluoroscope of 4 cases of **asthma during the paroxysm**. In the first case the right half of the diaphragm scarcely moved and the left side had very slight motion. The second patient showed but slight excursion on either side during respiration, and the diaphragm was flattened on the left; while the 2 other cases showed flattening on both sides with lessened excursion. The author believes that it is possible to conclude from this that spasm of the diaphragm is not the only cause of asthma.

H. C. Thomson⁴ reports 3 cases in which a diagnosis of **thoracic aneurysm** was supported by finding an abnormal shadow in radiographs of the thorax; and a fourth case in which the left chest gave a shadow over its whole surface, thus rendering a diagnosis of mediastinal growth more probably correct. F. H. Williams⁵ describes the ways in which the X-rays render aid in diagnosis. He especially emphasizes the value of observation of the location of the diaphragm and the extent of its excursions. It is lower on both sides in emphysema. In pneumothorax and with large fluid effusions it is lower and limited. He also notes that aortic aneurysm, and changes in the size, shape, and position of the heart, may be seen, and that one may note pulsation in the great veins. Williams⁶ states that in observing the lungs he finds that they are dark during expiration, and he believes that this is due to the presence of a smaller amount of blood. He believes that he has discovered evidences of consolidation before physical signs of such change were present, and in 3 cases believes that a central pneumonia which was diagnosed by the X-rays could not otherwise have been discovered. He has found indications of the existence of tuberculosis also when this disease had not been suspected previously. Kayser⁷ has been able to discover gall-stones in 4 instances by the use of the X-rays.

¹ Riforma Med., Sept. 11, 1897.

² Sem. méd., Dec. 15, 1897.

³ Wien. klin. Woch., Apr. 14, 1898.

⁴ Lancet, Sept. 18, 1897.

⁵ Brit. Med. Jour., Apr. 16, 1898.

⁶ Am. Jour. Med. Sci., Dec., 1897.

⁷ Wien. klin. Woch., Jan. 8, 1898.

GENERAL SURGERY.

BY W. W. KEEN, M.D., AND J. CHALMERS DA COSTA, M.D.,

OF PHILADELPHIA.

Review of the Year's Work.—During the past year, with two striking exceptions, surgical progress has not been revolutionary, but has consisted rather in the accumulation of statistical information regarding various diseases, injuries, and operations, the improvement of diagnostic methods, and the perfection of operative details. One of the striking exceptions alluded to is the performance of total gastrectomy by Schlatter and others for malignant disease of the stomach. This operation proved that the stomach is of far less importance than has been thought, and that man can live and thrive without a stomach. The other exception is the plan for treating pulmonary tuberculosis by injecting nitrogen gas into the pleural sac, and so producing pneumothorax.

Active debate still continues upon the best method of uniting a divided intestine. The value of the Murphy button has come to be generally recognized, but many surgeons seem to fear that the button itself, by remaining in the bowel, may be productive of disaster. In order to obviate this danger, some employ no mechanical aid; others use collapsible rubber cylinders, which are removed before completely closing the bowel-wound; some employ buttons of decalcified bone or ivory; and others use special forceps. The problem is not as yet settled.

There has been much of interest written upon forcible correction of the deformity in Pott's disease of the spine, after the method of Cabot and Chi-pault. Many operations have been performed, and the mortality is very slight, but the proceeding has not yet obtained general confidence. The profession as a whole is disposed to wait for a time, in order to determine whether the results are permanent.

Among numerous subjects which have particularly engaged professional attention we may mention the following: Treatment of intussusception; treatment of rupture of the liver; symptoms and treatment of rupture of the spleen; operation for typhoid perforation; the necessity for the early performance of gastrostomy in malignant disease of the esophagus; the proper incision for the removal of the appendix and the technic of appendicectomy; reports of several cases of suppuration in the right iliac region due to typhlitis, and not to appendicitis; the old question, Should every case of appendicitis be operated upon, and should the appendix be removed in every case? the radical cure of hernia by the injection of irritants; ambulatory dressing of fractures; massage in fractures; treatment of fractures by incision and wiring; resection and suture of arteries; suture of pericardium and heart; evidences and treatment of genitourinary tuberculosis; the use of silver salts for gonorrhea; drainage of empyemata by immersion in sterile water; surgery of the lung; surgical treatment of exophthalmic goiter; and the use of the X-rays in surgery.

ASEPSIS AND ANTISEPSIS.

Keen¹ describes the **sterilization of catgut by the Jefferson method**. This method was devised by Johnston. Gut which has been so treated is strong, pliable, nonirritant, antiseptic, and thoroughly satisfactory. [This method was set forth in the *YEAR-BOOK* for 1896.]

James E. Moore² warmly advocates **Boeckman's process** for the preparation of catgut. The raw gut is cut into pieces 20 or 40 in. long; each piece is wrapped in paraffin-paper and sealed in a paper envelope. The envelopes are placed in Boeckman's sterilizer, for 3 hours subjected to a temperature of 284° F. and for 4 hours more to a temperature of 290° F. The envelopes can be carried in the operator's bag. When the catgut is wanted the end of the envelope is torn off and the gut, wrapped in paraffin-paper, is dropped into a sterile tray. The paraffin-paper is removed by an assistant, whose hands are sterile. The gut is dipped for a moment only in sterile water; soaking for a longer time will make it fragile.

Thomala³ advocates the preparation of silk and catgut sutures by dipping them in **formalin-gelatin**. Ligatures thus prepared are not only free from germs, but are also antiseptic, for as the gelatin is dissolved the formalin is liberated. Catgut ligatures which have been treated with formalin-gelatin are not absorbed as quickly in the tissues as are ligatures treated with other substances.

Mikulicz called the attention of the Twenty-seventh Congress of the German Surgical Society (Apr., 1898) to his method for sterilizing silk. He boils it for 30 minutes in a 4% solution of carbolic acid, keeps it for 24 hours in ether and iodoform (5% of iodoform), and places it until needed in an alcoholic solution of carbolic acid containing 4% of acid. The alcohol used is 70%.

Delagenière⁴ employs **drainage-tubes** made of nickel, with a rim of considerable width, to prevent the instrument dropping into the wound. The tube is perforated in many places. When the tube is in place a cotton wick is passed into the lumen, and this wick draws up wound-fluid as a lamp-wick draws up oil.

H. O. Reik and W. T. Watson⁵ describe an apparatus for **sterilizing instruments with formaldehyd**. The experimenters employed an air-tight tin box with a capacity of 1½ cubic feet; wooden blocks were introduced to reduce the capacity to 1 cubic foot. Racks for instruments were suspended in the upper part of the box, and the gas was evolved below. At first the attempt was made to obtain the gas by spontaneous evaporation, and 100 c.c. of the 40% solution of formalin were placed in an evaporating-tube in the bottom of the box. By this method an exposure of 2½ hours was found necessary to sterilize instruments. It was decided that it would not do to use formalin for the generation of formaldehyd gas by heat: first, because the heat would not only drive off formaldehyd, but also the vapor of water, and the last-named product might rust the instruments; second, because paraform is a much more convenient material to employ.

The formalin was generated by heating paraform pastilles with Schering's formalin-lamp within the box. Three gr. of paraform will sterilize the chamber in 15 minutes, 5 gr. in 10 minutes, and 10 gr. in 7 minutes. It has been stated that neither formaldehyd gas nor liquid formalin dulls cutting-

¹ Ann. of Surg., Jan., 1898.

³ Münch. med. Woch., Apr. 19, 1898.

² Phila. Med. Jour., June 22, 1898.

⁴ Sem. méd., Apr. 6, 1898.

⁵ Bull. Johns Hopkins Hosp., Dec., 1897.

instruments (E. A. de Schweinitz and Swan M. Burnett). The authors' conclusions are as follows:

"1. A lamp will burn in any absolutely closed chamber long enough to generate more than sufficient formaldehyd for its disinfection. 2. In a chamber of 1 cubic foot space 3 gr. of paraform in 15 minutes, or 5 gr. in 10 minutes, will accomplish disinfection. 3. The expense of such disinfection, including the cost of paraform and alcohol, will not exceed 1 cent, and the labor involved is almost nil. 4. For the disinfection of small instruments, such as those used by ophthalmologists, otologists, laryngologists, and dentists, it is by far the most convenient and speedy method. 5. This method, probably better than any other, for the work designed, carries out the principles of disinfection laid down by Koch—viz. 'the absolutely certain destruction of all pathogenic organisms, in the shortest possible time, at the least expense, and with a minimum of injury to the object of disinfection.'"
[An apparatus to sterilize instruments, dressings, and sutures is shown in the illustration. The gas is produced by vaporizing pastilles of paraform. The upper cup is not used with the lamp. The materials to be sterilized are placed upon the shelves, a 5-gr. pastille is placed upon the lower cup, the lamp is lighted, and the door of the sterilizer is closed. In from 5 to 10 minutes sterilization is complete.]

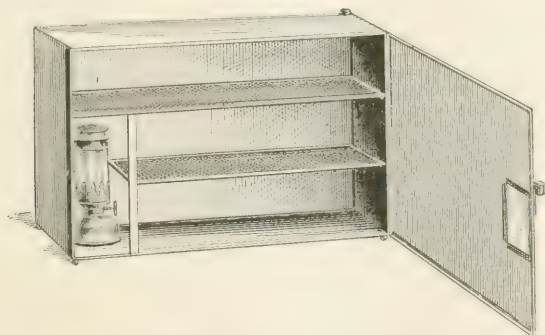


FIG. 1.—Apparatus for sterilization of instruments, etc.

Landerer and Krämer¹ consider the value of **formalin in disinfecting the skin**. The authors allude to the acknowledged difficulty of sterilizing the skin, and call attention to the fact that in 124 cases Lauenstein employed it, and in only about 50 of them obtained a sterile surface. Microorganisms are on the skin and also in the skin, and no disinfection is thorough which does not destroy the bacteria which are in the skin. A gas is the only agent which we can expect to enter into the skin. Influenced by these views, Landerer and Krämer have employed formaldehyd, and have succeeded in perfectly sterilizing the field of operation in between 80% and 90% of cases. The method is applied as follows: After the skin has been cleansed as usual with soap and water, a piece of gauze, soaked in a 1% solution of formalin, is laid upon the part, and is covered with some impermeable material. The formalin is kept upon the cutaneous surface from 24 to 36 hours, the compress being changed

¹ Centralbl. f. Chir., Feb. 26, 1898.

every 12 hours. It is not wise to use formalin longer than 48 hours, because it will harden the skin and interfere with primary union. At the time of operation the formalin is removed, and the field of operation is again scrubbed with soap and water and washed off with ether or alcohol. [The surface of the body is covered with multitudes of bacteria, and some of them penetrate the epiderm. It is most important to cleanse the skin of the patient, but it is even more important to cleanse the hands of the surgeon, for his hands are particularly apt to have been in contact with virulent germs, and his fingers must, of course, be introduced into the wound. The question as to the best method of sterilizing the hands of the surgeon and the skin of the patient has been much debated. For a number of years it was generally believed that the most essential element of any process was a brief immersion in a chemical germicide, but of late it has come to be recognized that scrubbing with soap and water is first in point of usefulness; that the chemical germicide is an aid or accessory to, but is never a substitute for, careful mechanical cleansing; and that even a prolonged application of the germicide will not certainly disinfect. This point has been forcibly dwelt upon by Schimmelbusch. If the germs on the hands were as easily destroyed as are germs in culture-tubes, prolonged immersion in antiseptic fluids might be efficient; but the problem is entirely different. In a test-tube there is nothing but the growth and the culture-medium, but on the surface of the body the organisms lie in cracks and furrows, and are embedded in dirt, grease, and organic material, and even prolonged immersion in an antiseptic fluid cannot destroy germs which are so placed and embedded. Whatever antiseptic is employed, the first thing to do is thoroughly to scrub the forearms, hands, and especially the nails, with soap and hot water, clean and cut the nails, scrub again, and then wash with alcohol. Some operators use nothing but soap and water and then alcohol, and claim to obtain satisfactory results. For a number of years it was our custom to cleanse mechanically by the above process, and supplement it by scrubbing with a hot solution of corrosive sublimate of the strength of 1:1000. This method was fairly satisfactory. Geppel and Abbott, however, independently reached the conclusion that corrosive sublimate will not thoroughly disinfect the hands. Fürbringer maintains that the addition of alcohol removes grease and also a portion of the epiderm, and leaves the way clear for the action of the corrosive sublimate. The addition of alcohol is certainly a great improvement, and by its aid we can satisfactorily sterilize the field of operation, but not always our hands. Carbolic solutions are absolutely unreliable. Kelly washes first in a saturated solution of potassium permanganate, next in a saturated solution of oxalic acid, and finally in distilled water; but Kelly's method is not always certain (Reinecke), and in many people produces a considerable degree of dermatitis. Weir uses a method which we can testify from personal experience is most satisfactory, and which we now regularly employ. It is applied as follows: Scrub the hands and forearms in running hot water with a brush and green soap; clean under and around the nails with a bit of soft wood; place in the palm of the hand a little less than a tablespoonful of chlorinated lime and an equal amount of washing-soda; add enough sterile water to the mixture to make a cream-like mass, and rub this cream over the forearms and hands until granules are no longer detected. This rubbing should occupy about 5 minutes. The paste is pushed under the nails and around their margins by means of a piece of orange-wood. When the paste is washed off with sterile water the hands are sterile. This mixture removes fat, grease, and a part of the epiderm, and evolves nascent chlorin, which is an active germicide, and, being a gas, enters into the tissues to a greater degree than can a liquid.]

As long ago as 1889, Halsted began the use of **rubber gloves**. He says in a note to Keen: "I wear gloves if, for example, I am removing a foreign body from the knee-joint or suturing a freshly broken patella, or exploring the abdomen, or doing a simple hernia operation, or any other simple operation which does not require a delicate touch or dexterity, and which, if suppuration supervened, might be followed by unpleasant results." His assistants always wear them. Manteuffel uses rubber gloves when operating on a septic case, when operating on a clean case after having operated on a septic case, when he has a suppurating area on his own hand, or in a sudden accident. Rubber gloves have certain objections. If they fit accurately, they are hard to get on, and are apt to tear in drawing them on; if they are large enough to put on easily, they do not fit, and make one clumsy. Furthermore, they distinctly diminish the acuteness of touch and are expensive.

Mikuliez,¹ of Breslau, uses thin **white cotton gloves**, and likes them very much. The sense of touch is not notably diminished when these gloves are worn. Even if the glove is a little large, when it becomes wet with blood it hugs the finger closely. Ligatures are not apt to slip when held with the gloved hand. If the gloves are in contact with pus or feces, the gloves can be cast aside, the hands disinfected, and another pair of gloves put on. Mikuliez considers operating with gloves the equivalent of operating with "boiled hands." He not only wears gloves, but wears a sterile cap, to prevent hair, dandruff, and sweat falling into the wound. Furthermore, the distinguished Breslau surgeon believes that the mouth of the operator may be responsible for infection of the wound (speaking, coughing, sneezing, etc.). In order to prevent this catastrophe a piece of bandage should be worn over the mouth and nose, and over the beard if the surgeon has one. [The cap is very useful, but we consider the respirator a needless refinement. Perthes, of Leipsic, uses gloves made of fine silk web.]

C. Menge² maintains that gloves diminish the acuteness of the sense of touch. He advocates the envelopment of the hands in an aseptic coating. They are cleansed mechanically, the skin is softened by soaking in sterile water, disinfected with an alcoholic solution of corrosive sublimate, and are then soaked for a time in 70% alcohol, and dried with a sterile towel. A mixture of paraffin and xylol is then poured over the hands, forming an impermeable coating. [At the Twenty-seventh Congress of the German Surgical Society, Berlin, Apr., 1898, a discussion took place upon the value of gloves. Mikuliez, of Breslau, considered gloves a necessity. Perthes, of Leipsic, said that gloves are necessary, but should be made of silk or rubber. He has no confidence in cloth gloves, because when wet they permit the passage of bacteria. A pure rubber glove blunts the sense of touch. Silk is the best material. Gloves are especially necessary in the treatment of emergency cases and in military surgery, because in such cases there is often no time to prepare the hands, and in military surgery there may be a scarcity of water. He carries the gloves in a white stocking, so that they can be pulled on without touching the outer surface. Döderlein uses gloves only in emergencies, when there is not time to sterilize the hands. In cases in which there is no great hurry the hands can be sterilized by the old method. Cloth gloves, he holds, are valueless, and if any are needed he uses Wölfler's rubber gloves. Bunge prefers the naked hands. Zoge-Manteuffel uses rubber gloves. Lauenstein strongly believes in gloves. Wölfler now uses buckskin gloves which have lain for several days in xylol, and finds them impervious to bac-

¹ Centralbl. f. Chir., July 3, 1897.

² Münch. med. Woch., Jan. 2, 1898.

teria. Friedreich uses a very thin rubber glove. Neuber thought much of the talk about gloves nonsense, and said the hands can be cleansed.]

Tison¹ maintains that **traumatol** is an efficient antiseptic; it prevents the multiplication of bacteria, is free from odor, and is superior to iodoform. It can be employed for the treatment of infected areas, ulcers of the skin, eczema, etc. [Traumatol is iodo-cresin. It is a violet-colored powder and is non-poisonous. Schultermann has shown that it may be used as a powder, plaster, crayon, or collodion. It can also be employed mixed with glycerin and vaselin. The crayons are used to treat sinuses.]

Credé² considered the use of **silver** as an antiseptic. Lactate of silver (actol) is superior to corrosive sublimate as an antiseptic, but it has the property of coagulating albumin, and in consequence cannot be used to dust into wounds. Citrate of silver (itrol) is an excellent antiseptic for the treatment of wounds. The ideal antiseptic must be capable of acting within the body. He tried injections of silver lactate, but found that it caused aseptic foci of necrosis. He then tried metallic silver in a form soluble in water (Heyden's preparation). This preparation of silver is also soluble in albuminous fluids. In sterile serum and blood it remains metallic silver, but if it encounters pathogenic germs it acts as a germicide or antitoxic material. A 1% solution is used, and several gm. may be injected. In a septic disease an ointment can be used, the drug being absorbed from the skin. In an adult 3 gm. are used for an inunction; in a child 1 gm. In making an inunction, rub in the salve for from 15 to 30 minutes. The inunctions can be given at some part far from the seat of disease, and yet benefit will be obtained. Credé maintains that injections of a solution of metallic silver and inunctions of a salve containing soluble metallic silver are of great value in septic diseases. [Liebreich says of **soluble silver** that it never causes argyria; that several grains of a 1% solution can be injected painlessly and safely; that it is nonpoisonous and produces no local tissue-changes; and that it is best used as an ointment.]

SUPPURATION, ETC.; GANGRENE; TETANUS, ETC.

Heddaeus³ considers the **treatment of traumatic tetanus**. He believes that **tetanus-antitoxin** should be administered in every case, and asserts positively that it acts as a specific, especially if given soon after the inception of the disease. When changes have begun in the nerve-cells of the cord and medulla the chances of cure are much lessened. Although the serum should be our main reliance, sedatives should also be administered, and effort should be made to favor elimination of the poison.

Wm. G. Porter⁴ made a report to the Philadelphia Academy of Surgery upon a case of tetanus treated with antitoxin. The symptoms began 11 days after a punctured wound of the ball of the great toe. The patient was admitted to the hospital 17 days after the accident. Antitoxin-treatment was begun the day of admission. Sedatives were also administered. She died on the seventh day after admission. The injections produced no apparent effect upon the symptoms or the general condition. In the debate upon Porter's paper, Penrose described a case of tetanus which had begun 11 days after trachelorrhaphy and perineorrhaphy. The patient was treated with morphin, bromid, and chloral until the fifth day of the disease, when antitoxin was administered. Six injections were given in 2 days. Two hours after the first

¹ Progrès méd., Sept. 11, 1897.

² Twelfth Internat. Med. Congress; Arch. f. klin. Chir., Band lv., Heft 4, 1897.

³ Münch. med. Woch., Mar. 22, 1898.

⁴ Ann. of Surg., Feb., 1898.

injection the patient became markedly worse. The patient died on the seventh day of the disease. Penrose stated that "decided harm was done by the administration of the antitoxin."

T. S. K. Morton reported a case of tetanus treated by sedatives, bleeding, saline infusion, and antitoxin. The disease began 8 days after the infliction of a penetrating wound of the sole of the foot. This patient died 6 days after the beginning of the disease. Antitoxin seemed to have no effect.

John B. Roberts spoke of a case of tetanus following abortion, in which antitoxin was of no avail, and of another fatal subacute case in which antitoxin was used for a time only.

C. W. Dulles expressed doubt as to tetanus being invariably traumatic; he had seen some cases which appeared to be instances of irritation, and remembered one fatal case in which he could find no cause but exposure to cold, although the woman had received a slight burn 5 days before. He agreed with Decroix, that many deaths from tetanus are caused by "incendiary medication," and did not believe that the treatment to-day is more rational or successful than the treatment of 100 years ago. Practically we must rely on chloral and bromids. Many careful observers believe that no cases have been cured by antitoxin which might not have been cured by other methods. In many cases other measures have been associated with treatment by antitoxin. Hearn called attention to the fact that a case of tetanus might be thought idiopathic because the wound was very trivial. He believed there always was a wound. Mears agreed with Hearn. [It is very difficult to make a just estimate of the real position of the antitoxin of tetanus. Reports of laboratory workers indicate that it has valuable immunizing properties, but its therapeutic powers are much disputed. Opinions from which to choose are many and various, from the view of Trevelyan, who doubts if it does any good, to that of Hewlett, who considers it most promising; from the assertion of Weir, that it cured 9 out of 11 cases, to that of Schaeffer, who considers the results in human beings inconclusive; from that of Berger, that the treatment has proved a failure in Paris, to that of Dennis, that it is a remedy of the greatest value.] Dennis¹ believes in the use of antitoxin as a prophylactic when the bacilli have been found upon the vulnerating body in regions where tetanus exists, and in cases where it is probable that infected soil has entered the wound. The immunizing dose is 10-20 c.c., given once a week for 3 weeks.

Chafford and Quenu² report a series of experiments upon animals, made to determine the value of intracranial injections of antitoxin for tetanus. They followed the plan of Roux and Borrel. As the results impressed them favorably, they determined to try it on a human being. The patient was a male, aged 16. He crushed his finger April 8. On April 22 trismus began, and soon became grave. On April 26 the skull was trephined, a small disc of bone was removed, a hypodermic needle was pushed into the cerebral substance to a depth of 5-6 cm., and 2 c.c. of antitoxin were injected. By the seventh day the patient had become calm, and by the seventeenth day was well. The injection did not cause any cerebral lesion.

[In coming to a conclusion several facts are to be constantly borne in mind. The fatality of tetanus is greatly influenced by the period and the acuteness of onset. Cases which come on early and acutely are usually fatal; cases which come on 10 days or more after the accident are, in not a few instances, recovered from. Cases in which the wound is suppurating are more dangerous than cases in which the wound is free from pyogenic infection. Cases following

¹ Ann. of Surg., Dec., 1897.

² Presse méd., June 18, 1898.

injury about the head are more fatal than cases following injury of some other part. Many unsuccessful cases are not, and most successful cases are, published. We are not sure that the cases which recovered would not have recovered under some other plan of treatment. In some reported cases, especially of children, the diagnosis is not clearly established. We are inclined to agree with Kanthack that in acute cases serum-treatment has not improved the prognosis, though in milder cases it may improve the condition and to some degree lessen the mortality. Goodrich¹ studied 226 cases of tetanus: 64% of those treated by old methods recovered, and 63% of those treated by antitoxin recovered. In cases of short incubation there are more recoveries under antitoxin than under antispasmodics. Most antitoxin cases have been recorded, while many cases treated by other methods have not.]

Walther Peterson² discusses **immunization and serum-therapy in staphylococcus-infection**. It is not as yet proved that staphylococcus-infection can be successfully treated by serum-therapy. The first question to be determined is whether the condition is an intoxication or an infection. As a matter of fact, pure infection is rare, and the condition is usually a toxic infection.

The second question is: Does staphylococcus-infection establish immunity? That it does not produce a prolonged immunity is absolutely proved by clinical experience, but it may produce a brief and partial immunity.

The third question is: Can protective agents be found in the body-fluids after an attack? The author asserts that such materials do exist in the blood-serum after an attack of staphylococcus-infection. He has tested Viguerat's serum, with inconclusive results, and has experimented with the protein of Buchner and the toxalbumin of Brieger and Fränkel. He conducted further investigations, and found if a culture is sterilized by heat and injected, it will protect an animal from the effects of a dose of staphylococci which will cause death in one to which no injection is given. Injection of filtered cultures seems to be useless. The injection of attenuated cultures produces various results, but is fairly successful. These experiments, Peterson states, do not point to the proper method for manufacturing a serum to treat men.

[Robert F. Weir³ has reached the following conclusions in regard to Marmorek's antistreptococci serum: It is of some value in erysipelas, and probably in scarlatina. It is not proved to be useful in puerperal sepsis; in fact, the evidence points to the opposite conclusion. Further investigations should be made to determine its value in cellulitis, osteomyelitis, and peritonitis. The usual dose is too small; 150 c.c. a day can be given without hesitation.]

Walter Courtney⁴ writes on the **treatment of septicemia by means of yeast-nucleinic acid**. He was much impressed by Vaughan's experiments, which showed the inhibitory effect of nucleinic acid upon the bacilli of tetanus, anthrax, and tuberculosis, and the frequent curative effect of this agent when administered to animals suffering from either of the above-named diseases. Courtney employed the remedy in 10 cases of septicemia, with gratifying results (only 1 case died). Courtney admits that the cases were not treated by the nuclein alone, but other means were also used to combat the poison (free elimination was secured). The nuclein should be given early and by hypodermic injection. If a 1% solution is used, from 30 to 40 minims are given every 3 or 4 hours, and the solution need not be diluted. If a 5% solution is used, from 10 to 15 minims are given every 3 or 4 hours, but

¹ Ann. of Surg., Dec., 1897.

³ N. Y. Med. Jour., vol. 65, No. 24.

² Beiträge zur klin. Chir., Band xix., Heft 2, 1897.

⁴ Med. News, Sept. 25, 1898.

the solution must be diluted with sterile water to prevent local irritation. The advantage of the 5% solution is that it remains stable, but the 1% solution often decomposes. The injection should be given with aseptic care. Courtney concludes that the results of this treatment "are sufficiently encouraging to justify a feeling of confidence and a continuance of its use."

Honsell¹ says that 1 case of **carbolic-acid gangrene** is met with in every 1000 surgical cases. He finds in literature 43 well-described cases. In most cases the fingers and toes suffer. He does not believe that the thromboses which exist cause the gangrene, but thinks they are simply associated with it, and claims that the gangrene results from traumatism of the cellular tissue to a degree which arrests circulation. [It will be observed that the author disagrees with Frankenburg and others, who maintain that the gangrene is due to the thromboses.

Czerny, in speaking of carbolic-acid gangrene induced by carbolized dressings, says it is of the dry variety. The anesthetic effect of the acid prevents suffering, and in consequence the patient leaves the dressings in place, and the part becomes entirely black without any pain being complained of. Disturbances of circulation predispose to gangrene from carbolic acid (tight bandaging, high inflammation, or severe injury). Czerny says that prolonged application of a weak solution is more dangerous than a shorter application of a stronger solution, and in view of the fact that even the mildest of solutions may cause gangrene, he concludes that this drug should never be used as a dressing. J. Lévan,² of Budapest, saw this form of gangrene in 26 cases out of 20,417 patients. In 12 of these cases weak solutions were used, but in 14 the gangrene followed the application of strong acid. In most of these cases the drug was used without the advice of a physician and was kept applied continuously. Lévan says there are 42 cases recorded in literature. In addition to these, Morestin has reported a case, and Czerny 3 cases, making a total of 46 reported cases.]

Howard Lilienthal³ writes upon **acute sepsis**. He tells us that this dangerous condition should be watched for, and if it arises should be promptly treated. Among the symptoms to which he calls particular attention are pain, great restlessness, an anxious expression, sleeplessness, delirium and confusion of mind, jaundice, and emaciation. Persistent pain should always claim the surgeon's attention. The treatment of acute sepsis consists in removing as far as possible the local cause, sustaining the strength of the patient, and stimulating the elimination of the toxins. There is no specific.

CYSTS AND TUMORS.

Frederic Eve⁴ has reported 2 cases, in each of which a **mesenteric cyst arose in a young child**. The first case was admitted to the hospital when 11 weeks of age. He had wasted since birth, and labored under diarrhea and vomiting. A movable and fluctuating tumor was detected on the right side of the abdomen. The diagnosis was made of mesenteric cyst. The abdomen was opened, and a cyst the size of a tangerine orange was discovered on the free margin of the mesentery. The cyst was aspirated, 2 ounces of turbid serum were removed, and the cyst-wall was attached to the abdominal wall. A few days later the cyst was incised and a drainage-tube inserted. The child recovered entirely from the operation, but 6 weeks afterward was attacked with convulsions, rapidly went into collapse, and died. The autopsy failed to

¹ *Centralbl. f. Chir.*, Mar. 5, 1898.

² *N. Y. Med. Jour.*, June 11, 1898.

³ *Ibid.*, Aug. 14, 1897.

⁴ *Brit. Med. Jour.*, Nov. 13, 1897.

show any cause of death. The second patient was $3\frac{1}{2}$ years of age, and was admitted for acute intestinal obstruction. The abdomen was opened, and a large cyst was found to occupy the right flank. It contained 32 ounces of serum, was at the free margin of the mesentery, and pressed upon the intestine. The cyst was excised, but death followed from shock. Eve said that these 2 cases were of the form known as lymphatic or serous cysts, which arise in the lymphatic glands of the mesentery. In the first case the cyst contained considerable unstriated muscular fiber. The best operative procedure is to attach the cyst-walls to the parietes and subsequently drain. Excision is a far more dangerous operation. [Something over a year ago Berkely G. A. Moynihan¹ made a study of mesenteric cysts. He concluded that the following cysts may be located primarily in the mesentery: 1, serous; 2, chylous; 3, hydatid; 4, hemorrhagic; 5, dermoid; 6, cystic malignant disease (sarcoma). Cavemous lymphangioma of the omentum, varicose lymphatics, and lymphatic nevus may lead to cyst-formation. Moynihan concluded that mesenteric cysts may be met with at any age; they are much more common in women than in men; dermoids occur only in women; the size of the cysts is very variable; the tumor usually approaches a spherical outline and may be lobed; its most prominent part is usually a little to the right of the umbilicus; the navel does not protrude; the tumor is very mobile; fluctuation is present; there is a zone of resonance on percussion around the tumor, and on light percussion there may be a resonant area crossing the tumor; the cyst is obviously not connected with the liver, spleen, kidney, or pelvis. Small tumors may give no symptoms; large tumors present symptoms. In a chronic case there is some pain in the tumor and about it, passing into the flanks and groins. There is often colic, due to efforts of the intestine to overcome pressure. There is rarely tenderness. There are usually vomiting and constipation, but there may be diarrhea. In acute cases the appearance of symptoms of acute intestinal obstruction first draws attention to the abdomen. In both forms there may be rapid body-wasting.]

W. Bergmann² reports a case on which he operated for **dermoid cyst of the anterior mediastinum**. The man was 38 years of age, and labored under a cough, with but a small amount of expectoration. There was a swelling back of the second and third ribs of the right side, on a level with the middle of the sternum. The tumor was doughy to the feel and somewhat painful; the skin above it was bluish-red in color. There was a small opening, from which a thick secretion escaped. Free resection of the ribs and sternum was performed, and a cavity was opened which contained some semisolid material, a couple of teeth, and some lanugo hairs. The tumor extended to the region of the aorta and descending cava. The cavity was curetted, sponged, and packed. During the performance of the operation the patient coughed up some blood and caseous matter, and coughing continued at intervals for several days subsequently, but on the fifth day it ceased and the patient recovered.

Goebel³ reports a case in which he removed a tumor from the femur of a woman 54 years of age. The tumor resembled closely the structure of a thyroid gland.

J. Bland Sutton⁴ furnishes some notes on **unusual cases of tumors**. The first case was a chondroma of the submaxillary gland. He says that a careful study of the structure of the salivary glands would not cause us to suspect that they are liable to tumors composed of hyaline cartilage. These tumors are fifty times as frequent in the parotid as in the submaxillary gland.

¹ Ann. of Surg., July, 1897.

³ Münch. med. Woch., Apr. 12, 1898.

² Prag. med. Woch., Mar. 10, 1898.

⁴ Practitioner, Nov., 1897.

A chondroma of the lacrimal gland has been described, but there is no record of such a tumor in the lingual gland or in the pancreas. In the case described by Sutton it had lasted 44 years, and had finally become so cumbersome that the patient was obliged to rest it upon her shoulder. He removed the tumor, and found that it was incorporated with the submaxillary gland and supplied by the facial artery, which blood-vessel was greatly enlarged. The growth was not connected with the parotid gland. It was composed of hyaline cartilage, which had softened and formed cystic spaces. The tumor was removed and the patient quickly recovered. The same observer reports a pedunculated growth of the nipple. Microscopically it was found to be fibrocellular in structure. The growth was congenital. Pedunculated tumors of this sort are very rare in the mamma, although not uncommon in other regions. If an extensive area is involved, the disease is called *molluscum fibrosum*. There is no histologic difference between the pedunculated lobular tumor and the large rhinoceros-like folds so characteristic of *molluscum fibrosum*. Occasionally the disease assumes the form of multiple distinct sessile nodules; the three forms—folds, nodules, and pedunculated tumors and stalked tumors—may grow concurrently on an individual. Sutton also records a case of lipoma of the plantar fascia and dermoids arising in the internasal fissure.

Henry M. O'Hara¹ reports the removal of a **bony tumor from the body of the sphenoid bone**. The patient was a boy, 13 years of age. For years past his left nostril had been occluded. He was quite deaf in the left ear and the face had a vacant expression, and he could not breathe when the mouth and right nostril were closed, but could breathe through the right nostril. Examination of the posterior nares detected a hard mass, and when the probe was carried through the left nostril it struck upon this mass. The diagnosis was osteoma of the sphenoid bone. Tracheotomy was performed, and the left upper jaw was excised. The palate was sawn by means of a fine saw, in order to avoid sacrificing an incisor tooth. The saw was carried along the side of the nose, along the lower border of the orbit, and through the malar bone. The superior maxilla was pulled down upon the cheek and the soft palate cut with a scalpel. The tumor, which was about the size of a bantam's egg, was removed piecemeal with chisels and gouges. The superior maxillary bone was replaced in its normal position, the soft parts were sutured with silkworm-gut, and the jaw was retained in place by means of a thin leaden interdental splint. This patient recovered completely and the bone united solidly, the wound healing by first intention.

Robt. Abbe² reports a remarkable case of large, multiple **neurofibromata of the cervical sympathetic**. The mass was removed. During the operation no unusual phenomena were noted. For a week following operation the conjunctiva of the same side was suffused. Ever since the operation (5 months) the pupil has been contracted, and there is narrowing of the palpebral fissure. There was no flushing of the face or furring of the tongue.

Wm. B. Coley³ reports a remarkable case in which a woman labored under a **carcinoma of the breast** and also a sarcoma of the submaxillary region. The author tells us that Roger Williams has collected 11 cases of the coexistence of mammary cancer and sarcoma elsewhere. Besides these cases, Hutchinson has reported a case in which the eye was removed for melanotic sarcoma; 10 years later the patient died of uterine cancer; and Cutler has

¹ Austral. Med. Gaz., Sept. 20, 1897.

² Ann. of Surg., Apr., 1898.

³ Ibid., Jan., 1898.

reported a case of sarcoma of the ovary with cancer of the thoracic and abdominal organs.

R. H. M. Dawbarn¹ presented a man to the New York Surgical Society to illustrate the result of **excision of both external carotids and of the superior maxillary bone**, for malignant disease of the latter. Dawbarn first completely excised the left carotid, and intended to follow this operation with excision of the right external carotid and then watch the growth carefully, and if it should show any sign of advancing he intended to excise it. The consultant in the case, however, advised removal of the jaw. Consequently this operation was performed at the same time that he excised the other external carotid. That was about a year ago. The entire superior maxilla on the diseased side, with the exception of the orbital plate, was removed. At this period, a year subsequent to operation, there had been no sign of recurrence. He believed that simple excision of the two external carotids would have stopped the growth. He had not had any recurrence in any case in which he had done this. One thing was certain, that simple ligation on both sides, without excision, was useless. There are too many sources of anastomosis. It is true that seven years ago Bryant succeeded in starvating a malignant growth of the nasopharynx by ligation of both external carotids, but he must have been fortunate in the small number of anastomoses in that case. Dawbarn has noticed that there is particularly free anastomosis at the site of the infraorbital, and he is inclined to think that hereafter he will not only excise both carotids, but will also tie off the infraorbital. There is no danger of producing gangrene. He has counted 19 means by which anastomosis may take place after the operation. In no case had there been a fatal result. In each case the operation required an hour or more, and was esteemed sufficiently grave to operate upon one side only at one sitting. The surgeon should begin below and work up. It is easy at one point to produce facial paralysis, but here he used only blunt dissection. [Dawbarn devised this operation some 3 years ago. He excises both external carotids from end to end. He is now able to report 11 instances, counting both sides, performed by himself. The external carotid is exposed, tied at its point of origin, and divided. The artery is lifted up with forceps and dissected upward, every branch being tied and divided as it is reached. When we reach the point where the carotid artery enters the parotid gland, the knife is put aside because of the danger of cutting the facial nerve. Traction is made upon the artery and dressing-forceps are used to stretch into the gland. When the bifurcation is reached a single ligature is thrown over both branches and tightened by forceps, and the external carotid is divided. One of the editors (Keen) recently removed a sarcoma of the tonsil, and immediately resected the external carotid of the same side, and later the other external carotid. Keen's object was to prevent recurrence after removal of the growth. The other editor (Da Costa) performed this operation, and is gratified with the shrinkage it induced in the tumor. We believe Dawbarn's operation is of great utility, and that it has a definite future.]

Wm. B. Coley² presents a study of the **influence of injury upon the development of sarcoma**. During the past 8 years he has had under his care 170 cases of sarcoma, and has been strongly impressed with the frequency with which a history of trauma is met with. Trauma has an important bearing on the etiology of sarcoma. Another aspect is the matter of accident-insurance. If sarcoma, in a majority of cases, is the result of injury, a company may be liable. American companies only admit trauma as causative

¹ Ann. of Surg., Sept., 1897.

² Ibid., Mar., 1898.

if the interval between the injury and the origin of the tumor is very short. Out of the 170 cases, 46, or 27%, give a history of trauma. In 8 cases the tumor appeared within 1 week, in 10 between 1 week and 1 month, in 6 between 1 and 2 months, in 7 between 2 and 6 months, in 4 between 6 months and 1 year, and in 10 after 1 year. In 14 cases the injury was a blow, in 12 a fall, in 4 a contusion, in 3 a finger-nail scratch, in 2 a fracture, in 2 a sprain, in 2 a laceration, in 2 a strain, in 1 a carbolic-acid burn, in 1 a shot-wound, and in 3 the form of trauma was doubtful.

In 1888 Wm. T. Bull operated upon a dentist for sarcoma of the femur. The growth was due to knocking the thigh against the lever of a dentist's chair. The patient told Bull that he knew of 6 other dentists who had developed sarcoma from the same cause.

Carl Pfeifer informed Coley that he knew of 4 cases of sarcoma due to striking the tibia while jumping over a bar.

Löwenthal has made a report upon sarcoma following traumatism, and found 316 cases in literature. In 135 of these cases the growth appeared within 1 month of the injury, in 33 between 1 month and 1 year, in 22 after 1 year.

Wolf asserts that 20% of cases give a history of trauma. In the younger Gross's collection of 165 cases of sarcoma of the long bones, over 50% show an antecedent trauma. In Walker's report on sarcoma of kidney it is seen that of 142 cases there had been trauma in 30 (21.13%). Many surgeons believe that injury can be influential in producing sarcoma only when individuals have tissues which are strongly predisposed to the disease—in other words, in people with a sarcomatous diathesis (Butlin, Barwell, and many others). Harrison Cripps say that such an explanation does not explain. "What the surgeon removes must not be regarded as the disease, but as the product of some hitherto-unexplained irritation, a portion of which is almost certainly left behind, and which will, in time, cause a reproduction of the disease."

Some observers, like Löwenthal, assert that "the trauma itself does not furnish the real cause," this fact being rendered evident by the numberless traumatisms which are not followed by tumors. This argument of Löwenthal's is of no value. We are constantly exposed to tubercle, diphtheria, etc., yet few of us are infected, but this fact does not prove that the bacteria of these diseases are harmless. Schröder and Rindfleisch attach great importance to the absence of nerve-influence. Schröder cut the nerve of a rabbit's thigh, and then fractured the femur. Instead of normal callus, a tumor formed. Billroth strongly believed in the theory of general predisposition. Virchow believed in a local predisposition, inherited or acquired. Cohnheim taught that local predisposition is due to defective embryonic development, and that traumatism is of little moment.

Coley says that the clinical evidence, aside from bacteriologic and pathologic testimony, points strongly to specific infection as the cause of sarcoma. There is a striking analogy between sarcoma and known infectious diseases: for instance, tuberculosis, actinomycosis, glanders, and syphilis. Just as a tuberculous lesion is apt to develop after injury, so is sarcoma. In each case the injury simply creates a point of least resistance. That we have not found the infectious cause is not proof that it does not exist.

George Henry Edington¹ records a case of **sarcoma in the infra-spinous muscle**, occurring in a girl 8 years of age. He excised the scapula, and the patient recovered with a useful limb. The patient recovered rapidly.

¹ Brit. Med. Jour., Aug. 21, 1897.

and has good use of the limb, although abduction and flexion of the shoulder are limited.

J. McFadden Gaston¹ records the successful **treatment of sarcoma by electrolysis and cataphoresis**, combined with the internal use of Donovan's solution. The patient was a boy, 12 years of age, who had suffered for months from a growth in the hypogastric region. On exploratory incision it was found that the tumor presented the characteristics of sarcoma, and was obviously irremovable by the knife. Later, Hunter McGuire examined the case, reopened the incision, and examined a bit of the growth microscopically. This examination showed that the tumor was a small round-cell sarcoma. The author applied electrolysis and cataphoresis, with the internal use of Donovan's solution. Soon there were notable changes in the size and density of the tumor and the general condition of the patient. The tumor shrunk distinctly. In 4 months there was a reduction of $1\frac{1}{2}$ in. in one direction, $1\frac{1}{2}$ in. in another direction, and 5 in. in another direction, and the tumor, which was previously fixed, had now become mobile. The patient is said to have been finally cured.

At the Denver meeting of the American Medical Association William B. Coley presented a paper upon the use of **mixed toxins of erysipelas and Bacillus prodigiosus in the treatment of inoperable sarcoma**, with immediate and final results, based upon a personal experience of 6 years. He said that he had continued his observations in spite of predictions that had been made by surgeons, that in a year this method of treatment would be consigned to oblivion. He called attention to the fact that he had always stated that the treatment should be restricted to inoperable sarcoma. In rapidly growing round-cell sarcoma of bone he would not use the toxins. In a few cases he had employed the treatment after operation in order to avoid recurrence, and he considered the outlook in this direction hopeful. He had never claimed to be the first to substitute the toxins for living cultures. All the successful cases had been due to the combined toxins, and he does not know of any case having been reported as successful from the use of the toxins of erysipelas alone. He was confident that the degeneration of tumor-tissue was decidedly increased by the addition of the toxins of the *Bacillus prodigiosus*. The theory that was generally accepted of the action of these materials was that they produced a local process of necrosis, but he had seen cases disappear entirely without breaking down. The toxins must act through the blood-serum, and cause in many cases coagulation-necrosis, with breaking down of the tumor-cells. In the spindle-cell variety absorption without breaking down was more common; whereas in the round-cell variety the reverse was true. If the agent is injected at a distance from the tumor, a much larger quantity of the remedy can be given subcutaneously than when injected into the tumor. A surgeon should begin with a minimum dose and increase it gradually and carefully. This plan will render the risk very slight. The changes in the tumor are marked by decrease in vascularity; next, loss of the glossy appearance of the overlying skin; then the tumor becomes more mobile, and a visible reduction in size is observed. If marked improvement is not observed in 3 weeks, there is no use in continuing the treatment. He has treated 80 cases of round-cell sarcoma. In 2 of them the tumor disappeared entirely, and 35 were improved. One of these patients was well for 3 years, and one for $1\frac{1}{2}$ years. He has treated 20 spindle-cell sarcomata; every one of them showed improvement, and 10 completely disappeared. Seven of these patients have now been well for over 3 years, 8 from 1 to 3 years, and 4 from

¹ Ann. of Surg., Aug., 1897.

6 months to a year. Since his paper in 1895 he has treated 8 cases successfully. Six of these were considered inoperable, and in the 2 that were operable the disease had rapidly recurred. In 7 of these cases the diagnosis was confirmed by the microscope, and in the eighth the diagnosis seemed absolutely certain. [When we consider such results as Coley sets forth, it is impossible to lightly put aside the treatment as unworthy of attention. His claims must be regarded, the treatment must be extensively tried, and those who have not obtained such results, among whom are the editors, must consider carefully if they have failed in any portion of the technic. Moullin¹ has recently reported 2 cases in which there was great benefit. In these cases Moullin acknowledges that he cannot prove that the growths were sarcomatous, but he is positive they were not gummatous and were not inflammatory. Watson Cheyne believes that in spindle-cell sarcomata the treatment may be of great value.]

William Yeats² writes on a case of **cancer of the breast treated by injection of alcohol**. The woman was 58, with a growth of the left breast which had been noticed 8 months previously. One month before beginning the treatment the skin gave way, an offensive discharge was set up, and the pain became considerable. The left breast was twice as large as the right and much heavier. The nipple was much retracted, and the skin was ulcerated under and to the left of the nipple for about an inch, considerably indurated around, and adherent to the underlying parts. A large, hard, knobby tumor existed. There were several smaller masses along the lower edge of the pectoralis major muscle, and the glands in the axilla were a good deal enlarged. She positively declined to submit to operation. He determined to try injections of alcohol. On Feb. 20 he took a mixture of 40 parts of absolute alcohol and 60 of distilled water and injected it deeply into the tissues all round the tumor, and into the axilla in the neighborhood of the enlarged glands; 23 syringefuls, each containing 20 minims, were injected. These injections, which averaged from 22 to 25 syringefuls at each time, were used on Feb. 27; Mar. 3, 8, 13, 17, 20, 24, 27, 31; Apr. 3, 8, 11, 14, 18, 25; and May 2. Each sitting occupied three-quarters of an hour. After the injection collodion was smeared over the needle-pricks, to prevent the fluid running out. The pain caused was considerable, and lasted from half an hour to an hour. After the second series of injections the patient declared that the sensations in the breast were altered. The shooting-pains disappeared and never recurred. Also, the itching on the breast-surface disappeared. After the treatment had been continued for 5 weeks the parts around the tumor became edematous. The injections were continued and were thrown into the edematous parts. During the sixth week the patient and her nurse claimed that the growth had diminished, and by the beginning of the eighth week the whole breast had diminished in size. After this time the breast and tumor rapidly shrunk, and in May there was nothing left of the mamma to be felt by the hand, and nothing of the tumor but the nipple and trifling thickening under it. There was still slight edema in the injected area. The glands in the axilla could not be detected. After these 17 injections a complete structural change apparently took place. The intention was to continue the injections at longer intervals for a considerable time, but, unfortunately, the patient became ill otherwise. On May 16 it was found that she had a cancer of the liver, and nothing further was done. The patient grew rapidly worse, and died June 10. After death the breast and all the surrounding structures were removed, as well as a part of the liver: and these were submitted for examination to

¹ Brit. Med. Jour., Nov. 13, 1897.

² Ibid., Sept. 25, 1897.

Delepine. The report of Delepine was that the mamma was replaced by a dense, fibrous-looking mass, with several processes extending into the surrounding fat. It was firmly connected with the subjacent pectoral muscles. The cutis vera, subcutaneous tissue, and fat surrounding the mamma, on microscopic examination showed distinct signs of proliferative inflammation of the connective-tissue elements and an infiltration with leukocytes. The tumor itself presented in most places the appearance of an atrophied scirrhus carcinoma. The periacinous connective tissue showed in a marked degree the metamorphosis described as elastic degeneration. These signs of atrophy of epithelial elements and increase of connective-tissue stroma were not absolutely general, and in some parts the tumor presented the appearances of a typical scirrhus carcinoma. The section of liver showed several confluent nodules of scirrhus carcinoma; very cellular epithelial cells of the same type as those found in the mammary tumor; extensive tracts of necrosis, biliary pigmentation, and capsular hepatitis. In conclusion, the pathologist says that the mammary tumor showed signs of marked irritation of the connective-tissue elements and atrophy of the epithelial cells, and that these changes may be fairly attributed in part to the action of the alcoholic injections, although the similarity existing between the hepatic secondary growth and the primary mammary tumor throws a certain amount of doubt over this conclusion. Yeats says that the clinical history showed an enormous diminution of the cancer of the breast and complete disappearance of the glands in the axilla; and had not the cancer in the liver developed, there was every prospect of a complete cure of the cancer of the breast. The action of alcohol seems to be that the tissues, more especially the cellular, become indurated and contracted; that the bloodvessels are sealed up; that the nerves are compressed, and that the strangulation of the sources of nutrition produces shrivelling and atrophy of the tumor. The cases in which this plan is indicated are those in which operation is absolutely refused or those in which it is impracticable, and, perhaps, in certain cases after operation, with the hope of preventing recurrence. This form of treatment was first suggested by O. Hasse.¹ He showed that parenchymatous injections of alcohol lead to sclerosis, cell-proliferation, and cicatrization in all new growths. In 15 out of 18 cases of cancer of the breast the growths shrank until nothing was left but connective tissue, and the general health of each case was vastly improved. [The method is promising and should be given careful trial. Edwin J. Koek recommends the treatment.² Hasse says the alcohol should be diluted one-half with water, or more if the patient is sensitive. One or two syringefuls are enough to use at a time. The fluid is thrown into the retromammary tissue. At first, one or two injections a week are given, and later one every second or third week.]

Hermet³ made a report to the Paris Dermatological Society upon the **treatment of epithelioma of the face with arsenous acid.** The acid was applied to the surface of the ulcer and left exposed to the air, after the method of Czerny. By the third month the growth was completely destroyed, and the ulcer had cicatrized a month subsequent to this period. Previous to this, potassium chlorate had been used, without avail. Czerny's method, which was employed by Hermet, is carried out by using 3 solutions of arsenous acid in equal parts of water and ethylic alcohol. The first solution is of the strength of 1:150, and is applied directly to the ulcerated area. The second and third solutions are stronger, and are applied to the scab. The ulcer is touched with a solution every day, and if the pain of application is

¹ Arch. f. path. Anat., Nov. 4, 1896.

² Med. Rec., Apr. 17, 1897; Phila. Med. Jour., May 28, 1898.

³ Lancet, Mar. 26, 1898.

severe, hypodermic injections of morphia are given. When the scab drops off, the raw surface is treated as is an ordinary wound.

The Russian Pirogoff Surgical Society¹ debated the use of **chelidonium in cancer**. The extract of the *Chelidonium majus* is injected into the cancer or round about it, and the drug is also given internally. For subcutaneous injection a 50% solution of the extract is used. The injection is made every day or every other day, for many months, and 50 to 90 gr. of the extract are given internally every day for many months. It is claimed that the drug produces softening and a certain amount of breaking down of the growth, and some observers think that it acts also as a caustic. The injections cause considerable pain and may produce a constitutional reaction. The internal administration of the drug seems useless, although some observers claim that it does have a certain amount of local influence. [This drug was introduced by Denissenko, who maintains that it has some specific action, or at least renders the tumor more easily enucleable. Winter and Schmitt² have reported upon the drug. They have seen no case in which a tumor was benefited, and consider the drug to be entirely useless, only making the general condition of the patient worse. Freudenberg³ used the remedy only locally. He thinks it has a palliative action on the disease.]

Charles N. Dowd⁴ makes a study of 29 cases of **operation for cancer of the breast**. He shows how the efficiency of the operation has increased of recent years. In 1878, von Winiwarter made a report upon 170 cases operated upon by Billroth. The mortality was 23.7%; 82% of the remainder, whose subsequent history could be ascertained, had recurrences, and only 8.3% of those who were operated upon 3 years and more before the report were living and free from recurrence or metastasis. Since that time, Bull, of New York, has been able to show 26.6% free from recurrence. Rotter shows 50%; Helferich, 28.6%; Cheyne, 57%; Dennis, 45%; May, 35%. The mortality from the operation has very greatly diminished. Weir reported 25 consecutive operations without a death; Halsted and May each reported 76 consecutive operations without a death. Dennis's only death in 74 cases was due to hemophilia; and Cheyne had only 1 death in 64 cases, and for this ether was probably responsible. Dowd's 29 cases have been operated on since Mar., 1893. In 6 of these cases the operation was performed more than 6 years ago, and 3 of them are alive and well. One of the 3 had some small nodules removed from the axilla 6 months after operation; 3 years have elapsed since this second operation. 52% of the remaining cases are now alive, and the deaths which have occurred have been mostly due to metastasis. The most important question in discussing the technic of the operation is, How much tissue shall be removed? About 3 years ago Halsted and Willy Meyer at the same time advocated very extensive operations, consisting in the removal of the breast and axillary contents, and a large part of one or both pectoral muscles, in one mass. It was also suggested that the lymph-gland above the clavicle should be removed. This operation not only removes muscles and fascia which are very often infiltrated with cancer, but it gives easy access to the axilla, and this method should be chosen unless there are obvious reasons for avoiding it. There are objections constantly raised to this operation. The first is that it needlessly mutilates the patient. This objection is certainly not valid. Patients after this operation has been performed have good use of the arm; they can raise it to dress the hair, can employ it in ordinary household

¹ Vrach, No. 32, 1897, abstract from Brit. Med. Jour.

² Centralbl. f. Gynäk., July 10, 1877.

⁴ Ann. of Surg., Mar., 1898.

³ Ibid., July 31, 1897.

avocations, and can put the hand behind the back. There is, of course, some loss of power in adduction. The second objection is that edema may be caused by stripping off so extensive a portion of the axillary vein. As a matter of fact, this edema, when it does arise, is temporary. The third objection is that the extensive operation increases the danger. The truth of the matter is that, if asepsis is maintained and if hemorrhage is quickly arrested, the radical operation is no more dangerous than is the Volkmann operation. It is an easier matter to remove the sternal portion of the great pectoral, or even the entire muscle, than it is to strip off its superficial layer and retract it in order to gain access to the apex of the axilla, and the removal is accompanied by less bruising of the tissues and fewer dead spaces are left. In this series of cases there was only 1 fatal case, a woman of 73, whose resisting-power was at a low ebb, and who succumbed to an infection which would not have been important in a stronger patient. Some surgeons remove the muscles in advanced cases, but do not remove them in recent cases; but it is in recent cases that a thorough operation is most important. If any cases are to be denied the advantages of a radical operation, it should be advanced cases, for in many of these the growth has already advanced beyond the tissues accessible by operation. In recent cases we have more hope of eradicating the disease. The size of the breast-tumor is not indicative of the extent of the growth in the axilla. Dowd has found very extensive axillary and cervical involvement where the mammary nodule was not larger than a walnut. Some operators advise that the posterior cervical triangle be always cleared; others say that if the cervical lymphatics are involved, the disease has already spread to the mediastinum or other inaccessible parts, and hence a palliative operation is useless. Dowd fails to see that his patients would have been better off had the posterior cervical been cleared. The supraclavicular lymphatics are sometimes cancerous, and when they are they should be removed, as their removal does not add materially to the length or danger of the operation. The extent of the skin-incision is a matter of importance. Dowd's usual plan is to carry it about 2 in. from any place where the growth impinges upon the skin-edges. The upper part of the incision is carried to the insertion of the pectoralis major, passing above, not through, the axilla. The skin is then widely laid back externally and below, so as to expose the latissimus dorsi and the lower fibers of origin of the great pectoral. This incision permits removal of the subcutaneous tissues and allows subsequently a successful approximation of the skin, and usually there is no defect requiring to be filled by grafting or granulation. Considerable tension may be used if the parts at a distance from the wound are thoroughly supported by the dressing. If, in spite of traction upon the flaps, there is a defect, skin-grafting should be done at the time of the operation. In none of these cases have recurrences taken place. The axillary artery or vein has not been cut, because no patient would have been benefited by that procedure. In the only case in which they were involved in the growth, the cancer had spread so far as to render any curative operation out of the question. The long subscapular nerve has not been cut, although parts of the vessels which accompany it have frequently been removed. The 8 recurrences among the 23 patients who have had the complete operation were, with 2 exceptions, in patients who had such extensive growths that only palliative operations could be done. Taking these cases together, they argue for early and thorough operation, and hold out a hope of cure in from one-third to one-half the patients who are operated upon in a reasonably early time. Even in those who are not cured, there are lessening of suffering and prolongation of life. If the disease has already spread

beyond the operative field, death from metastasis cannot be prevented. It is an interesting fact to note the results obtained by individual operators as they have become accustomed to remove more and more tissue. After one of these operations a patient suffers very little pain. On the second day the head of the bed, and with it the shoulders of the patient, is elevated. On the third day solid and semisolid food is administered, and the arm is loosened in the sling. The patient is usually out of bed a part of the time by the sixth or seventh day. Generally, patients leave the hospital some time in the third week. Twenty-one of the cases healed by first intention, in spite of the fact that 9 of them had ulcers on the breast at the time of operation. The method of dressing is very important. The skin-flap should be held in close apposition to the chest-walls by strips of rubber adhesive plaster which have been firmly applied outside of the sterilized gauze which was placed directly over the incision. Cotton outside of this is held firmly in place by a binder or a sleeve, and this is held firmly in place by safety-pins. The binder makes firm pressure on the wound and adds materially to the patient's comfort. It is easily put on, and may be easily readjusted if too tight, or removed and repinned when dressing is necessary. The arm is supported in a sling, which is pinned to this bandage.



FIG. 2.—Dowd's binder for holding the dressing in position after operation for cancer of the breast (Annals of Surgery, Mar., 1898).

John F. Binnie¹ comments on the fact that **recurrent carcinoma** is apt to be locally worse than was the primary disease in the same region. After operation many important lymphatic channels are occluded and a collateral lymph-circulation is established. If, after operation, an area of cancer remains and begins to grow, the disease is spread widely about by means of a multitude of collateral lymph-channels which have enlarged since the first operation, and which have become large enough to disseminate cancer-cells. In some cases of primary cancer of the breast in which there is extensive axillary involvement, occlusion of lymph-routes takes place, and a condition similar to that outlined above is produced, although no operation has been performed.

Gerota² has made a study of the direction in which **secondary infection from breast-cancer** spreads. He states that the lymphatic vessels are in close association with branches of the internal mammary artery. This fact explains the strong tendency to infection of the retrosternal glands, and also the adhesion of the pectoral muscles, which is apt to take place at an early period. He found that the lymphatic glands of the thorax do not have independent sets of lymph-vessels, but are in intimate connection with one another, which serves to explain the infection of the right side after the left, and *vice versa*.

Watson Cheyne³ reports 2 cases in which the operation of **oöphorectomy** was performed for **inoperable cancer of the breast**. In the first case there was a marked temporary improvement, which lasted for only 6

¹ Ann. of Surg., Feb., 1898.

² Centralbl. f. Chir., Sept. 4, 1897.

³ Brit. Med. Jour., May 7, 1898.

months, after which period the growth rapidly progressed. In the second case there was no benefit whatever. Watson Cheyne suggests that the surgeon should not be content with removing only the ovaries, but should also take away as much of the carcinoma as possible.

Edward Cotterell¹ describes a **new rectangular splint** which he employs after removing the breast. He tells us that in a case in which scirrhus of the breast has been removed in the ordinary way, with the arm tightly bandaged across the chest there are considerable discomfort and pain, and after the wound has healed the movements of the shoulder are generally painful and limited. Great advantage is derived from keeping the arm at a right angle to the body, instead of tightly bandaged across the chest. Cotterell uses a rectangular splint, as shown in the illustration. The splint is fitted with a movable

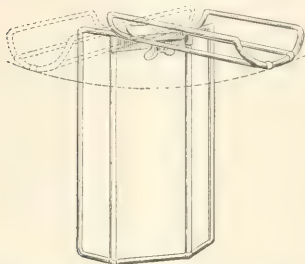


FIG. 3.—The upright piece is applied against the chest-wall, the horizontal part supporting the arm as far as the elbow (Cotterell, in *Lancet*, Feb. 5, 1898).



FIG. 4.—Method of applying splint (Cotterell, in *Lancet*, Feb. 5, 1898).

joint. This places the patient in a comfortable position, and, as the forearm and hand are left free, there is no cramp or stiffness of the elbow or fingers. When the splint is removed the shoulder is not stiff, and the patient can dress her back hair within 2 weeks of the operation. When this splint is used the requisite amount of pressure can be maintained to keep the surfaces of the wounds in apposition. Where much skin has been removed and the position of abduction causes too much tension upon the stitches, the arm can be brought forward and the parts relaxed by altering the joint of the splint to the required angle.

H. Teske² makes a report upon 25 cases of **carcinoma of the lower lip**. He advocates extirpation of the growth and also of the associated lymphatic glands, and employs an incision which extends from the mental spine to the larynx, with a cross-cut on each side following the lower margin of the inferior maxillary bone.

Quenu³ presents a study upon the **pathologic anatomy of rectal carcinoma**. His conclusions, which are of great interest, are as follows: Rectal carcinoma may arise in any portion of the rectum. It may occupy a limited portion, a large portion, or the entire length of the tube. The surgeon, in studying a case, must recognize the upper and the lower limits of the disease. It is well, from an anatomic point of view, to make a distinction between anal cancer and rectal cancer. Anal cancer develops from the skin or the dermopapillary mucous membrane, and in consequence is composed of

¹ *Lancet*, Feb. 5, 1898.

² *Centralbl. f. Chir.*, No. 4, 1898.

³ *Rev. de Chir.*, July, 1897.

squamous cells. Rectal cancer develops from intestinal epithelium and is composed of cylindrical cells. As a matter of fact, however, there are points here and there in which cells resembling intestinal epithelium and squamous cells are found, so that it is possible, at least in theory, to have a cancer low down which contains cylindrical cells. Further, it is known that a chronic inflammation of the rectum, syphilis, etc., destroys cylindrical cells; they may be replaced by squamous cells, so that in a rectum which has suffered from pre-existing inflammation a squamous-cell growth may develop well above the anus. The author suggests that the classification be founded on the indications for operation. His classification is as follows: First, anal cancer, a growth arising below the insertion of the levator ani muscle into the sphincter; second, infraperitoneal cancer, which originates between the levator ani muscle and the peritoneum; third, high cancer, one whose lower limits are near the cul-de-sac of the peritoneum and whose upper limit is at or above the lower end of the sigmoid flexure; fourth, cancer involving practically the entire rectum. Allingham has asserted that the point at which cancer is most frequent is about 3 in. from the anus. Most of the tumors are annular by the time they are observed, but this fact does not indicate that the original form was annular. An epithelioma, when it first starts, is often found on one of the intestinal walls, preferably the anterior or posterior. The disease may be further divided into the circumscribed form and the infiltrating form. The infiltrating form invades all of the coats of the bowel, and the walls of the rectum become rigid and adherent to adjacent tissues, and the growth may begin as such, or may follow upon the circumscribed form. An epithelioma does not remain for a long period limited purely to the wall of the rectum, but passes into neighboring tissues, and quickly invades the fatty tissue about the rectum. In the majority of cases the tissues become dense, thick, adherent to the gut, and at last edematous. Extension may take place in the direction of the ischio-rectal fossa, the skin of the buttock or perineum, the vulva or vagina, and cauliflower-excrecences may form. Cancer of the anus involving the sphincters causes fecal incontinence, septic absorption, abscess, and fistula. Diffusion of the growth may take place along the lymphatics. The glands which are involved depend upon the location of the growth. We may find enlargements of the glands of the groin, of the posterior hemorrhoidal glands, or the sacral glands, or of all of these. Enlargement of the sacral glands generally occurs. These enlarged glands are by no means invariably distinct, but are often overlaid by connective-tissue masses which have replaced the fatty perirectal tissue. Occasionally, enlargement of the median hemorrhoidal glands is noticed. Lymphatic involvement is the rule, but wide dissemination of the disease is rare. When it occurs, it takes place particularly by means of the lymphatics, and may involve the kidneys, pancreas, lungs, ovaries, spleen, bones, peritoneum, liver, or skin. In some cases the subclavicular glands are enlarged. Patients who suffer from cancer of the rectum are very liable to perirectal abscess and inflammation of the connective tissue about the rectum, cysts, peritonitis (due to perforation of the growth), phlebitis of the femoral vein and of the cavernous sinus, and suppuration of the hip-joint from perforation of the cotyloid cavity.

Henry T. Butlin¹ delivered the Hunterian Lecture for 1898, his subject being "What Operation can do for **Cancer of the Tongue.**" He excludes from consideration cases in which he did not perform the first operation, and considers only the cases which were under his charge throughout the course of treatment. A record of these cases is presented in the tables:

¹ Brit. Med. Jour., Feb. 26, 1898.

TABLE I.—*Hospital Cases.*

	Cases.
Died of operation	9
Lost sight of	7
Recurrence <i>in situ</i>	8
Affection of glands without recurrence	16
Died later, cause unknown (probably cancer)	4
Well within three years after operation	2
Well more than three years after operation	7
Total	53

TABLE II.—*Private Cases.*

	Cases.
Died of operation	1
Recurrence <i>in situ</i>	10
Affection of glands without recurrence	12
Died of other causes than cancer of the tongue within three years	4
Well within three years after operation	9
Well or died of other causes more than three years after operation	13
Total	49

It will be seen that the private cases show much more favorable results than the hospital-cases, because they are, as a rule, operated upon earlier. In many hospital-cases the disease is far advanced when first encountered by the surgeon, extensive operations are required, and the patients are often weak and ill-nourished. In the majority of patients set down as cured the anterior two-thirds of the tongue was the seat of the growth. Among the cured private cases the glands were not removed in 1. In 5 of the 7 cured hospital-cases the glands were removed at the time of operation on the tongue or afterward, and in 4 of the 5 they were not enlarged. Butlin does not remove the entire tongue in every case. He removed the whole tongue in only 1 of his successful cases. In his 102 cases he removed the entire tongue in but 16 cases, and 4 of the 16 died of the operation and 2 died soon after going home (from bronchitis and laryngitis). In 5 there was recurrence *in situ*, and only 1 was cured. Removal of the entire tongue is far more dangerous than removal of a portion of the organ. The patient's speech is always very defective, it is difficult to take solid food, and mucus and saliva collect in the mouth. Removal of part of the tongue will cure a considerable number of patients and will save a larger number from local recurrence. In Butlin's 66 cases in which local recurrence might have taken place, it occurred in but 18, and in 5 of these the entire tongue had been removed, and in 5 others the recurrence was in the floor of the mouth or some other part which would have been left even if the entire tongue had been removed. Butlin removes with the cancer at least $\frac{3}{4}$ in. of apparently healthy tissue round the growth in every direction. His table of cured cases is as follows:

TABLE III.—*Successful Cases.*

Duration since operation.	Cases.
1 to 2 years	6
2 to 3 years	4
3 to 4 years	5
4 to 5 years	3
5 to 6 years	4
6 to 7 years	1
7 to 8 years	1
8 to 9 years	2
9 to 10 years	1
10 years	1
12 years	2
Total	30

} More than 3 years,
20 patients.

Glandular enlargement will not be noticed, as a rule, for some months after the beginning of a tongue-cancer, but it may be noticed occasionally in a few weeks after, or even be detected the same time that the cancer is. In many cases in which the glands appeared normal at the time of operation, a successful result was prevented by the subsequent enlargement of these glands. Cancer of the tongue is locally malignant (usually limited to the tongue and the lymph-glands of the neck, and it very rarely disseminates). About 70% of cases can be so operated upon that there will be no recurrence *in situ*; but of these 70 persons, 30 or 40 will die of infection of the glands of the neck. If these 30 or 40 can be protected from glandular infection, the lives of many of them may be saved. We cannot tell clinically when glandular affection begins. It certainly begins long before there is detectable enlargement. The only safe rule when dealing with a case of cancer of the tongue is to regard the glands of the neck as already infected, even when there is no enlargement. In every case of cancer of the tongue the glands should be removed. There is much uncertainty as to the group of glands likely to be affected in an individual case. Sometimes the affected glands are behind the angle of the jaw; sometimes in the floor of the mouth, behind the symphysis menti; sometimes they are in the neck, on a level with the thyroid cartilage. Butlin says that the lymphatics of the tongue are so arranged that they may pass through one or more of four sets of glands; the submental, the submaxillary (some of which are *in* the submaxillary salivary gland), the parotid, and the carotid. It is rare for lymph from the anterior half of the tongue to reach the parotid region, but it passes through one or more of the 3 anterior groups. The anterior portion of the tongue is the most common seat of cancer, and in such cases the 3 anterior groups of glands should always be removed, and greater safety will be secured if the parotid lymph-glands are also removed. The anterior triangle of the neck should be thoroughly cleared. An incision 7 inches long is made along the anterior border of the sternomastoid, from the mastoid process to below the level of the thyroid cartilage; and a second incision is made from the symphysis menti to the first incision, above the level of the thyroid. Two triangular flaps are thus formed, and are lifted up. The dissection is commenced from the apex of the triangle below and is carried upward. All connective tissue and glands are removed in a continuous mass, including the submaxillary salivary gland. Between the muscles in front 1 or 2 deep-seated glands are removed, and the glands in front of the parotid gland and about the angle of the jaw are removed with the other contents of the triangle. It is difficult to remove the submental and parotid glands *en masse*. Butlin operates on the tongue first, and 3 or 4 weeks later clears out the glands. He considers the simultaneous operation to be hazardous.

Sinclair Tousey¹ writes upon **thiosinamin**. The drug is derived from oil of mustard-seed, and chemically belongs in the group containing urea. The author pointed out some years ago that this drug would cure keloid. He was led to use it in keloid because of the observation that it softened the dense cicatrices left by lupus. Another observation which led him to use it in keloid is the following: If a hypodermic injection of thiosinamin is given, white blood-cells are immediately disintegrated and eliminated, the number in the blood falling to about one-third of the normal, this condition being followed by marked leukocytosis lasting 48 hours. The leukocytosis and the individual activities of the leukocytes lead to removal of "effete or lowly organized material." This view is strengthened by the fact that the

¹ N. Y. Med. Jour., Nov. 6, 1897.

drug is an active diuretic. A solution of the drug should be made in a sterilized mixture of water and glycerin, 10 parts of the drug in 100 parts of the mixture. This solution is not irritant and keeps well. A full dose is 12-15 minims, injected into the triceps or glutei every third day. Larger doses cause nausea. For corneal opacities about 27 injections should be given in the triceps or glutei. There will be improvement in vision, but not much in appearance. The improvement is permanent. In corneal opacity we give the drug when there is no danger of awakening into activity a latent inflammation. The drug may be used by the mouth, in capsule, 3 gr. every day for 8 weeks. The value of the treatment in keloid, hypertrophied scars, and cicatricial contractures seems to be proved. His first published case of keloid remains well 3 years after treatment. The drug has a palliative effect upon inoperable malignant growths, and is of value in urethral stricture and in that form of deafness due to lessened vibratory transmission because of the existence of bands of fibrous tissue.

AMPUTATIONS.

Allen¹ reports a case of **gangrene of the leg** occurring during typhoid fever, in which the patient was so weak that it was considered inadvisable to administer an anesthetic and amputate. Poultices were applied until a line of demarcation formed, when the patient was given a dose of chloral and the leg amputated, without her knowledge, through gangrenous tissue. Six months after, the flaps were formed, the bones sectioned at a higher level, and their ends covered with the flaps. This was a decidedly tedious method of treatment, but the author considers it the only one which would have saved the patient.

Felix Franke² advocates **amputation at the neck of the femur** as a substitute for disarticulation at the hip-joint. He maintains that it can be done more rapidly; that the hollow is filled by the head of the femur; and that the time of healing is much shorter. The neck of the femur is rapidly divided with a broad chisel while the thigh is abducted. The head of the femur does not undergo necrosis, as it receives an ample blood-supply from the ligamentum teres.

Berger³ reports a case of **total excision of the scapula** for malignant disease. He considers that in removing the scapula the corresponding clavicle should be divided as a preliminary step in the operation. In a case such as this, in which a sarcoma exists, there is always considerable uncertainty in regard to the position of the axillary vessels and the brachial plexus. If the vessel and plexus are involved in the growth, simple resection of the scapula will not be sufficient, but the entire upper extremity must be removed. The preliminary division of the clavicle permits the surgeon to find the vessels and nerves, to determine accurately their connection with the growth, and to decide if resection of the scapula will be sufficient, or whether the interscapulo-thoracic amputation must be performed. This surgeon maintains that when the axillary vessels are covered by the tumor and it is impossible to make out their relation to the disease, the posterior and upper part of the tumor should be exposed by incision, the clavicle divided in the middle, and the two fragments widely separated. We can now determine the position and the state of the vessels and nerves. If these structures be found free from disease, the epidermis of the deltoid and the clavicle and scapula are separated,

¹ Med. Rec., Dec. 25, 1897.

² Centralbl. f. Chir., No. 45, 1897.

³ Bull. et Mém. de la Soc. de Chir. de Paris, tome xxiii., 1897.

and the capsule of the shoulder-joint is separated from the margins of the glenoid cavity; the muscles between the scapula and the humerus are cut through, and the muscles attached to the coracoid process are divided. To clear the superior and axillary borders of the scapula, turn the bone back, so as to separate the subscapula from the thorax, and cut through the muscles inserted into the posterior border of the bone.

Alexandre Posadas¹ reports a case in which a child, 15 months of age, labored under a sarcoma of the shoulder and arm. The **interscapulo-thoracic amputation** was successfully performed.

ANESTHESIA.

J. Ernest Stokes² reports 2 cases of **acute intestinal obstruction** in which asphyxia resulted from vomited matter entering the air-passages. In these cases chloroform was first administered and ether afterward substituted. The writer believes that the relaxation induced by the anesthetic permitted the regurgitation of fluid which was previously retained under pressure. In such cases Stokes advises lavage before the administration of the anesthetic, and giving the anesthetic with the head and shoulders raised. He considers the Trendelenburg position dangerous. [We are not persuaded that the Trendelenburg position is dangerous. It is quite true that regurgitated matter will run into the pharynx if this position is employed, but asphyxia will not be produced by fluid in the pharynx, and if the fluid gets into the pharynx, it will flow away from the air-passages under the influence of gravity. We believe the erect posture only intensifies the peril. Tiffany thinks he saved life in 2 cases by having them lie with their faces downward.]

Thomas J. Morton³ reports a **death by suffocation during ether-narcosis** in an exploratory operation for carcinoma of the stomach. The patient was 61 years of age; he had been sick for more than a year, suffering from dyspnea and other symptoms of disorder of the stomach. A tumor was discovered in the region of the pylorus. Ether was carefully administered upon a compress of gauze. The patient took the anesthetic badly. Finding that it was impossible to bring about complete anesthesia with ether, a few drops of chloroform were put upon the gauze. The operation was performed during the period of partial etherization and convulsive movements. An inoperable scirrhous of the pylorus was discovered, and it was decided to abandon the operation. During the closure of the wound eructations of liquid from the stomach occurred, and a large amount of fluid escaped from the mouth and nose. It was noticed that the difficulty of breathing was spasmodic. Irregular inspiration continued, and in spite of the employment of artificial respiration, injections of strychnin, and inhalations of oxygen, the patient ceased breathing in about half an hour after the completion of the operation, and without regaining consciousness. At the autopsy the bronchial tubes were found to contain a large amount of dark fluid material of the same character as that which had been vomited while the patient was on the operating-table. Morton says that he has been unable to find the record of any case exactly analogous to this one.

Phelps reported a case of asphyxia from vomiting during anesthesia while an operation was being performed for strangulated inguinal hernia. At the time of the vomiting of thin fecal matter respiration instantly ceased, and was never resumed. At the meeting at which Phelps's case was reported,

¹ Rev. de Chir., Oct., 1897.

² Ann. of Surg., Sept., 1897.

³ Phila. Med. Jour., Jan. 22, 1898.

similar cases were mentioned by other observers. Fecal vomiting seems particularly fatal in its effects, and, as Phelps pointed out, this cannot be avoided by preliminary lavage of the stomach, as entrance of fecal matter during the operation may occur at any moment. Phelps declared that the sight of 1 such case was enough to convince any surgeon that local anesthesia should be employed in strangulated hernia whenever possible. It seems probable that in exceptional cases of celiotomy some form of local anesthesia may be used with advantage to the patient when the administration of a general anesthetic is regarded as objectionable. [Such a case as the one reported by Morton warns the surgeon how necessary it is to evacuate the gastrointestinal tract prior to operation, and especially in cases with pyloric obstruction and dilated stomach, in which food may remain for days in the cavity; and that it is a safe precaution to have the patient's stomach washed out and emptied with the stomach-pump just previous to the administration of ether. In such an accident Nélaton's inversion-method would seem to be the proper means of favoring the expulsion of any vomited material which may have entered the trachea. On account, however, of the viscid nature of the material, this practice would not have availed in the above case.]

G. W. Green¹ makes a report of **1000 consecutive administrations of anesthetic agents** in the service of A. J. Ochsner, at Augustana Hospital. The youngest patient was 4 days old, and 9 were over 70 years of age; 605 were between 20 and 40 years. Chloroform was used 370 times; ether, 20 times; chloroform first, followed by ether, 610 times. In the first 300 anesthetics chloroform was used, unless there was some contraindication. In the next 400 chloroform was given until surgical anesthesia was produced, when it was maintained with ether. In the last 300 cases chloroform was given as long as the patient was able to count; then chloroform and ether together, not mixed, but dropped from separate bottles, until anesthesia was produced, which was maintained with ether. Chloroform was given by the drop-method, an ordinary Esmarch mask being used. Ether was also given by the drop-method of Prince, the ether being dropped on an Esmarch mask in the same manner as chloroform, but the framework of the mask was covered with twice the number of layers of gauze used for chloroform. The anesthetic was siphoned from a bottle by means of a twisted pledget of absorbent cotton, which extended from the bottom of the bottle to an inch outside. The size of the drop was regulated to a nicety by the fineness of twist of the cotton. No deaths occurred during anesthesia, and no deaths followed which were in any way traceable to the anesthetic. The ordinary preparation of the patient consisted of a dose of castor oil, a bath, and liquid diet a day before operation and intestinal lavage the evening before, with special preparation of the field of operation. The day of operation the patient received no breakfast, and no stimulants or narcotics were given before the anesthesia. Whenever possible, confidence was established between the patient and the anesthetizer. It was found that when this confidence did not exist that there was much greater liability to accident and annoyance during the first stage of anesthesia. The patient's face was anointed with vaselin to prevent burning, and a pad of moist, warm absorbent cotton was placed over the eyes to protect them from the fumes. All constriction was removed from the neck and chest, and the anesthetizer looked personally to the removal of foreign substances from the mouth. In giving the anesthetic, a mask is placed over the nose and mouth, and the patient is told to count aloud after the anesthetizer, who counts about 30 times a minute. After the patient has counted from about half a minute to a minute, the adminis-

¹ Chicago Med. Recorder, Mar., 1898.

trator begins to drop the anesthetic very slowly around the outer edge of the mask, at first, and finally all over the mask, increasing the rate of dropping until the patient is asleep. Counting with the patient quiets his fears, gives him confidence, and may partially hypnotize him. The nervous fear of anesthesia is undoubtedly one of the greatest sources of danger, and to allay this many surgeons make it a practice to give stimulants or narcotics just before anesthesia. If retching or vomiting occurred, the head was turned to the right side and phrenic compression, as suggested by Joos, was tried. This maneuver proved successful in 34 cases and unsuccessful in 39. There was retching in 116 cases, and retching and vomiting in 121 cases. Most of these occurred in the chloroform-and-ether anesthesia, and after a change was made to ether. Many times this was due to changing from chloroform to ether too quickly, giving the anesthetic too slowly, or transferring the patient to the operating-table before surgical anesthesia was complete. Care should be taken to prevent retching and vomiting during operation, as they greatly increase the risk of infection and annoy the surgeon and anesthetizer. There was violent struggling during the primary stages of anesthesia in 28 cases, and slight struggling or talking and singing in 20 cases. These occurred mostly in alcoholics and neurotics, and might have been partially or wholly overcome in most cases by a more careful administration of the anesthetic. It was noticed in several alcoholics who struggled violently during the first administration of the anesthetic, that on the second administration, when more care was taken, there was no struggling at all. On the first evidence of excitement the anesthetic was given slower and with more air, until this stage was passed. If there was the least embarrassment of respiration, the lower jaw was held forward against the upper jaw. At the first sign of cyanosis the tongue was pulled forward. The period of surgical anesthesia was determined by the existence of contracted pupils, general muscular relaxation, and deep respiration, with a good pulse. The corneal reflex was never sought for. Six times artificial respiration became necessary, and in each case the respiratory failure seemed to be due to a too rapid administration of chloroform in the beginning. It was found that particular care was necessary to anesthetize a patient when the operation was to be done upon inflamed tissue, especially if the patient was of a nervous temperament. Laparotomies necessitating the breaking up of adhesions and operations for rectal ulcers, fistulæ, etc., require special care. It was found that if these patients were profoundly anesthetized before being placed on the operating-table, there was much less shock than if the operation was commenced a little before or just as soon as surgical anesthesia was produced. In 1 case a scarlet rash appeared just as unconsciousness was produced. The rash came first on the face and then on the chest, and finally spread over the entire body. It commenced to fade just as surgical anesthesia was produced. It lasted about 55 minutes. In resuscitating a patient from the asphyxial condition, the first thing done was to see that air had free access to the lungs. The feet were elevated to an angle of 40 degrees, and artificial respiration was performed. No heart-stimulants were used and no oxygen gas was given. The sphincter ani was always stretched and ether poured on the belly; but artificial respiration was the only measure that seemed of benefit. Whenever the general nervous system was affected the anesthetic was given more slowly and with more air, and usually a change was made from chloroform to ether. As a rule, as soon as the change was made there was an improvement in the symptoms; but in a few cases, when little air was given with the change to ether and where ether was pushed, the symptoms continued, with the addition of

cyanosis or weakened pulse, which compelled the anesthetizer to give the agent slowly and with more air. The indications that the general nervous system is affected are muscular tremor, clonic convulsions, twitchings of individual groups of muscles, strabismus, sweating, and dilated and inactive pupils. Postanesthetic retching and vomiting were no worse when chloroform and ether were given together, as above described, than when chloroform was given alone. The retching and vomiting were relieved by a napkin wet with vinegar laid over the nostrils and an ice-bag over the phrenic nerve, small sips of hot water every fifteen minutes, and small pieces of ice, sips of strong coffee, and, in persistent cases, hot rectal enemata of normal salt solution. The author maintains that the anesthetic should never be crowded upon a patient under any circumstances; that the patient should never be moved from the bed to the operating-table unless fully anesthetized; and that he should never be lifted in the arms of an assistant nor should the head be raised above a horizontal position during anesthesia. When the heart-center has become so paralyzed by an anesthetic that there is no bleeding, or very little bleeding from the wound, no more anesthetic should be given under any circumstances.

Frederic W. Hewitt¹ writes on the administration of anesthetics, his remarks being founded on **6657 administrations** at the London Hospital. Several years ago chloroform was in routine use, but experience has somewhat shaken his confidence in it for general employment. He believes that if a man cannot trust himself to administer chloroform from a Skinner's mask, there may be some excuse for him using one of the modifications of Junker's apparatus; but it is better to give to the patient a share of the attention that is otherwise bestowed upon the inhaler. Simplicity and cleanliness are of the first importance, and Junker's apparatus should only be used in midwifery cases and in operations upon the mouth, throat, and nose. For the routine administration of chloroform there is nothing better than a Skinner's mask. In routine giving examine the chest, but the surgeon will not be able to tell from even the most thorough examination of the chest how a patient is going to behave under chloroform. More depends upon the type of the subject than upon the state of his heart or lungs. Some patients of a particular type take an anesthetic in a particular way. Of course, the author does not affirm that visceral diseases cannot modify the usual phenomena of chloroform; but the type of the subject is really the most important element in determining the phenomena likely to arise. Take, for example, two patients in a fair state of health, belonging to opposite types: one, a middle-aged and powerful man, with a thick neck, accurately meeting teeth, and an imperfect nasal air-way; the other, a spare woman, with defective teeth and a free nasal air-way. Chloroform may be given in the same way to each of these patients, but a different set of phenomena will be obtained, and the stethoscope in this case will be unable to predict the phenomena. In the robust man there would probably be a considerable amount of muscular rigidity and struggling, and an intercurrent state of more or less positive asphyxia. In the other case the patient would probably go quietly to sleep without the slightest difficulty on the respiratory side. If examined with the stethoscope before administration, the man's heart would have been found more vigorous than the woman's heart, from which it might have been argued that the patient with the stronger heart-action would take the anesthetic rather better than the other; but experience has shown that the reverse is the case. Other things being equal, the stronger the patient the more trouble with the anesthetic. Deaths from chloroform are more common in the middle period of life, and more men

¹ Lancet, Feb. 19, 1898.

than women die under this agent. Chloroform is more dangerous during the early stages of administration, and a large proportion of the accidents have occurred in connection with minor operations, which it seems undoubtedly are more common in vigorous subjects. The reason why these subjects are the worst admits of explanation. In the transition from imperfect to complete anesthesia their muscular systems are thrown into a state of spasm, which does not occur in less powerfully developed cases. Hill and Barnard have shown that deaths which occur early in chloroform-administration are usually due to rigidity, struggling, or holding the breath; secondarily, to a considerable quantity of the anesthetic being taken in during the succeeding respirations, so that the right heart, already distended, is paralyzed by the large amounts of chloroform carried to it. MacWilliam, Gaskell, Shore, Hill, and Barnard are all in accord as to the depressing effect which chloroform will produce upon the heart itself. They show that cardiac dilatation of varying degrees may be brought about by this anesthetic, and that it is this dilatation of the cardiac cavities which makes chloroform less safe than ether. There is no question that respiration should be carefully watched, and that every breath should be both *heard* and *felt*. Watching the chest or abdomen, as recommended by the Hyderabad Commission, is a fallacious guide, because the thoracic and abdominal respiratory movements will persist when absolutely no air is entering or leaving the chest. It is of great importance to avoid obstruction to breathing, excepting to a very minor degree. In general terms, obstructed breathing is best relieved by unlocking the teeth and pushing the jaw forward. A minor degree of obstruction, recognized by a softly snoring sound, is rather a favorable element than otherwise, because this slight obstruction keeps the respiratory apparatus freely and audibly working, and hence the circulation is well maintained, because, as we know, free thoracic movement has a great influence in the maintenance of good circulation. Very tranquil or almost imperceptible breathing may arise under chloroform independently of an overdose. This condition is most common in patients with free respiratory passages, and is liable to come on after respiratory excitement. It is rarely met with in patients with enlarged tonsils, adenoid growths, catarrhal diseases of the air-passages, emphysema, pulmonary phthisis, etc., because the tendency to obstructed or exaggerated breathing increases under an anesthetic. It is more common in chloroform than in ether, owing to the more irritant effect of ether and the great amount of mucus secreted, and to the greater extent to which air is excluded during the administration. Tranquil breathing in chloroform-anesthesia is of importance, because, unlike the analogous condition under ether, it is liable to lead to pallor and feebleness of the pulse, because the heart of the patient under chloroform is less able to meet the strain thrown upon it by feeble respiratory action than is the heart of the patient under ether: hence it is wise to avoid extremely tranquil respiration under chloroform, even during light anesthesia, and the anesthetizer should endeavor, when snoring breathing has been induced, to maintain it by a moderately free application of the anesthetic agent; but if snoring has never arisen, or has been permitted to disappear, it is wise to induce it artificially by pushing the lower jaw gently backward. The breathing will at once increase in force and circulatory depression will be counteracted. In some cases the administration of more of the anesthetic will have the same effect. It is possible that during snoring breathing carbonic acid is retained in the blood in larger amounts than during unobstructed respiration, and this retention may serve to explain the improvement in the patient's condition, for there is an antagonism between chloroform and carbonic acid, especially during the recovery of the nerve from

the effects of the anesthetic. A great deal of discussion has arisen as to the necessity of watching the pulse. The Hyderabad Commission state that the pulse should be disregarded. Hewitt could not understand why the Commission insisted upon this, until he saw Surgeon-Lieutenant-Colonel Lawrie administer chloroform. He then saw that the anesthetic state he induced was not so profound as that which surgeons are in the habit of producing. We know that it is necessary, particularly in abdominal, rectal, and vesical operations, to keep the patient deeply anesthetized. If chloroform be given in such a manner that the conjunctival reflex is not completely abolished, it is certainly true that pulse-observations are useless in estimating the effect of an anesthetic. In fact, in such a degree of anesthesia the pulse may mislead an inexperienced anesthetizer, for it may become weak just before vomiting, and such weakness may be supposed to contraindicate more anesthetic; whereas it really calls for more; but if chloroform be pushed so that the conjunctival reflex is positively abolished, the surgeon will find that pulse-observations will help him. The arterial tension fails. This condition can be recognized in the operating-room as well as in the physiologic laboratory. Every patient must not be expected to have a satisfactory pulse, and no alarm need be felt at the evidence of low tension which may assert itself, because a certain amount of pallor and a slow and rather weak pulse are not necessarily danger-signals. The pulse itself helps greatly in coming to a decision as to whether more or less of the anesthetic is needed. Usually, if more anesthetic be given, the pulse becomes slower and feebler; if less be given, it becomes faster and stronger. If the circulation is not watched during profound chloroform-anesthesia, failure of respiration may be the first sign that an overdose has been given. By carefully observing and interpreting pulse-changes it is often possible to prevent paralytic respiratory failure. There is a great deal to be said in favor of the use of ether and chloroform in succession. The stage of rigidity and excitement, which is the danger-stage under chloroform, is passed over under the stimulant effects of ether. Deaths during this stage are practically unknown with ether. Having secured a proper degree of ether-anesthesia, chloroform may be substituted, and anesthesia from chloroform will be more satisfactory than if chloroform had been given from the start. Hewitt has adopted this principle for several years, and finds that he is able to use chloroform without the occurrence of those symptoms which are occasionally bound to arise from the use of this agent from the commencement of administration. He considers this development as one of the most important of recent years. If the operation is a short one, and the administration of the ether was free from difficulty, it is not necessary to change to chloroform; but should ether cause cough, difficulty of breathing, or profuse secretion of mucus, or should the operation be a long one, a change to chloroform is desirable. The change from ether to chloroform must be effected carefully. If, when the patient is under ether, chloroform be given in the ordinary manner, an undesirable amount of chloroform may be absorbed by the forcible respiration and active circulation produced by ether. There should always be some evidence of the patient coming out from ether-anesthesia when chloroform is applied. It is best to have a conjunctival reflex present when the change is brought about, and in most cases the change should be made before the operation is begun. After ether-anesthesia has been established, very little chloroform is needed to keep the patient unconscious. There is, of course, no objection at all to preceding the administration of ether by the A.-C.-E. mixture, or by nitrous oxid, in order to save the patient from the unpleasant taste of ether; but the stage of rigidity should be passed over under ether. By this plan of changing from

ether to chloroform the anesthesia from chloroform is really as safe as the anesthesia from ether, and, indeed, the risk of subsequent bronchial or pulmonary troubles is reduced. The statement may be right that anesthesia is safer with chloroform than with ether, supposing the primary stage of administration to have been conducted under ether. The circulation is so excellently maintained that for the past 2 years Hewitt has given chloroform preceded by ether to a large number of patients in the sitting posture, and in not a single case has he been obliged to place the patient horizontally because of undesirable symptoms. Some of these operations lasted as long as one hour and a quarter. Hewitt then explains the apparatus which he uses for the administration of **nitrous oxid and oxygen**. By means of this apparatus it is possible to keep up nitrous-oxid anesthesia for an almost indefinite time; but it cannot be recommended for use in major operations, except in carefully selected cases. It is not altogether satisfactory in long operations. It is the safest method of anesthetizing at present known, and the unpleasant after-effects of anesthesia may usually be avoided when it is employed; but the anesthesia induced is not so deep as that produced by ether or chloroform, the muscular system is not so completely relaxed, and it is not always possible to prevent reflex and other movements during administration. The best results with nitrous oxid and ether have been with children and weak women. Strong, vigorous male adults, especially drinkers or excessive smokers, are bad subjects. Any attempt to employ it systematically in general surgery is inadvisable; but in certain carefully selected cases it is useful. Mansell Moullin removed the breast under nitrous oxid and oxygen; he also cleared the axilla and excised a small tumor in the flank. The administration lasted 35 minutes, but a great deal of vomiting followed the operation. Hewitt used it with great satisfaction in a case of Syme's amputation; in a case of hip-joint disease, in which he incised and gouged away portions of the necrosed bone; and in the case of a child who had a renal cyst opened and drained. It is important to avoid the ingestion of solids and fluids for several hours after the administration of this agent. The use of nitrous oxid and ether has, during the past few years, come somewhat into vogue. This plan is successful in many cases, but entirely unsuccessful in others. The general opinion seems to be that this method is absolutely safe, but Hewitt has seen patients have hairbreadth escapes from asphyxia. He refers, of course, to the administration of full doses of nitrous oxid followed by the sudden application of ether. Muscular men, especially men in middle life, who have become rather fat, should never be anesthetized by this method. If it is desired to employ nitrous oxid and ether, only a small quantity of nitrous oxid should be used, and the ether should be gradually added to it. In children and women the plan of administering a full dose of nitrous oxid and changing to ether is very useful. The method of using nitrous oxid, ether, and chloroform is excellent, but should only be employed by those who have had large experience in anesthetizing. The nitrous oxid is first given. It is pleasant to inhale, rapidly produces unconsciousness, and prevents struggling. Ether is useful because, if any rigidity or suspended breathing arises just before deep anesthesia, the circulation will remain unembarrassed. The stimulant effect caused by the ether lasts while the chloroform is being given, and the chloroform is finally given because of the quiet, deep anesthesia which it produces and because of the rarity with which after-effects follow its use. When there is no special contraindication there is no better plan of anesthetizing than this. In some cases it is useful to give the A.-C.-E. mixture, followed by ether. The A.-C.-E. mixture is given upon an open Skinner's mask, and after a couple of minutes

a Rendle's mask with more of the mixture may be substituted. As soon as rigidity begins the Rendle's mask is exchanged for an Ormsby's inhaler charged with ether. By this method many so-called bad subjects can be anesthetized; middle-aged and powerful men, with double chins and thick necks—such subjects in which asphyxial phenomena are sure to arise if gas and ether be given. There were 13 cases in Hewitt's 6657 administrations in which threatening symptoms occurred. In some of the cases the symptoms arose during the administration, and in others afterward. It is always difficult to be sure what share the anesthetic had in causing these symptoms. When dangerous symptoms arise during or after the use of an anesthetic, one or more of four factors may be responsible: first, the anesthetic itself; second, the condition of the patient; third, the posture of the patient; and fourth, the surgical operation. Hewitt first considers the causes of unpleasant symptoms which arose under ether. One patient was a female, 70 years of age, to whom ether was given for removal of an eyeball. The administration was conducted by means of a Clover's apparatus. Before the operation was commenced the patient's breathing became impaired. This is by no means uncommon; and just as the patient is passing into profound insensibility embarrassed breathing is frequent. In this case breathing stopped before the patient was thoroughly anesthetized. Many would apply the term "holding the breath" to the condition; but it is not an accurate term, because it implies voluntary action, which in this case had been abolished. As the breathing did not begin again, and as the patient was much cyanosed and the veins greatly distended, venesection was performed; 10 ounces of blood were withdrawn, when breathing immediately recommenced. No other restorative measure was necessary. In the next case of trouble the patient was being operated upon for an anal abscess, and when just under the anesthetic the patient stopped breathing; cyanosis was marked; artificial respiration was performed, during which breathing recommenced. This case is similar to the first one, except that artificial respiration was performed instead of venesection. It is very common just before anesthesia is complete for breathing to be temporarily suspended. This is usually due to the anesthetic vapor, or the mucus which it produces, setting up acts of swallowing, and these acts of swallowing are performed more slowly than when the patient is conscious. During normal swallowing the glottis closes momentarily; but during the passage into profound anesthesia the act of swallowing is prolonged over a considerable time, and during this time no air enters or leaves the chest. Besides this cause of suspended breathing of light anesthesia, there is another—general muscular spasm—which affects the muscles concerned in respiration and brings it to a standstill. In most cases this impaired breathing which comes on before stertor passes off spontaneously; but if it does not do so, it can be made to disappear by removing the inhaler, rubbing the lips with a towel, and pushing the lower jaw forward. In more obstinate cases, in which the jaws are clenched and the neck-muscles are contracted, it is necessary to separate the teeth and pass the finger to the back of the pharynx. Unless such simple measures are quickly adopted, a dangerous or fatal asphyxia will be liable to arise. The third case is of considerable interest. The patient was a spare, muscular man, 37 years of age, who had been a heavy drinker. The operation was internal urethrotomy. Ether was given by means of a Clover's inhaler. In giving ether to well-built men of drinking-habits it is advisable to limit the air-supply to a greater extent than when anesthetizing other types of patients, otherwise struggling and excitement will arise. Ether was given to this patient, with a minimum allowance of atmospheric air.

In most cases this works satisfactorily, but in this case there was an unsuspected element which altered the usual course of affairs. Just as the operation was being completed Hewitt noticed that the patient presented an unusual appearance. The eyelids were half closed, the eyeballs were upturned, and the face was pale and dusky. The pulse was small, rapid, and irregular; but the respiration was regular and deep. On placing the hand over the heart it was found that the impulse was rapid, irregular, tumultuous, and heaving. The stethoscope enabled the surgeon to make out a murmur, which was impossible to diagnose because of the noisy and tumultuous breathing and embarrassed cardiac action. The conjunctival reflex was by this time returning gradually; the pallor lessened and consciousness gradually appeared. No remedial measures were necessary. It was evident that a grave cardiac lesion was present, and that the patient had been in a dangerous condition under ether. Some few days after operation it was found that the heart was dilated and hypertrophied, and that there were mitral regurgitation and aortic obstruction. The compensation was fair, but there was a history of failure 10 weeks previously. There is none now, and the only sign of failure is irregularity. This case was examined with a stethoscope before operation, but the report given by the clerk was misunderstood, and the patient was anesthetized by the wrong method. In cases of *morbus cordis* in which there is want of compensation, asphyxial methods should be avoided. Nitrous oxid, nitrous oxid and ether, and ether itself when administered in a closed inhaler, are equally unstable. Limitation of oxygen, which is necessarily incidental to the administration of ether upon a Clover's inhaler, throws extra work upon the right side of the heart, even in healthy persons. When the patient has mitral regurgitation or obstruction a dangerous strain may be thrown upon the right cavities of the heart. In such a case the best anesthetic is the A.-C.-E. mixture. If for any special reason ether seems preferable, it should be given by means of a felt cone or Rendle's mask, to avoid all undesirable exclusion of air. It was interesting in this case to observe that the cyanosis usual in alcoholic subjects was replaced by a dusky pallor when the patient was under the anesthetic. The second point of interest is that the eyes gave early warning of danger. If the patient's complexion is not abnormally pale before an anesthetic is given, limitation of air produces what one might almost call a healthy cyanosis, and as long as this cyanosis is not associated with pallor, we may be sure that the heart is effectively driving along the imperfectly oxygenated blood. If the patient is very anemic, the healthy cyanosis is not so distinct. If, during the cyanotic state, the heart begins to fail, the features will become livid or ashy. Such a condition indicates grave danger, and is more common under chloroform than under ether; but if the heart of the patient under ether is crippled, it may behave like a healthy heart would under chloroform. In regard to the warning given by the appearance of the eyes, it may be said that when the lids are only partially closed and the globes are turned slightly upward, so that an unusual amount of sclerotic is visible, attention should be directed at once to the patient's general condition. These phenomena are liable to be noted in surgical shock from hemorrhage or other causes in asphyxiated subjects, and when the anesthetic has been freely administered. Flaccid, nearly closed lids, displaying subjacent sclerotics, are usually, though not invariably, indicative of an unsatisfactory condition; and when such a state is noted it is best to give less of the anesthetic. When the ocular phenomena above mentioned are present, conjunctival reflex is usually absent.

In the next case the patient was an anemic and emaciated male, 36 years

of age. The operation was resection of the intestine. Ether was administered by means of a Clover's inhaler. During the operation there was considerable pallor and the pulse was feeble, and just before the termination of the operation the patient ceased breathing for a brief time. In this case, also, the eyelids were but partly closed and the breathing spontaneously recommenced. The next case was of a similar character. The patient was a male, 40 years of age, and the operation was exploration of the upper end of the femur. He became collapsed at the end of half an hour. It is no uncommon thing for children whose general condition is unsatisfactory to exhibit evidence of collapse during protracted operations. One cannot entirely exclude the influence of the anesthetic, but this influence is of less importance. In cases such as this the use of enemata of hot brandy and water, injections of strychnin, and intravenous injection of saline solution are of great use. In the next case bronchopneumonia followed the administration of ether. For several years past the statement has been frequently made that ether does not kill upon the operating-table as often as chloroform, but it does so oftener afterward. It has been a difficult matter to estimate to what extent this statement is true. It is important to determine if the expressions "ether-pneumonia" and "ether-bronchitis" have a right to become current, and this can only be settled by observations during several years. In the case under consideration there is not the slightest doubt that the bronchitis arose immediately after the administration of the ether, but it is very difficult to say if the condition was due to the anesthetic wholly or partly, or if the bronchitis was a mere coincidence. The evidence seems to point to its having resulted from the administration of ether. The patient was a woman of 41; her general condition was excellent, her heart-sounds were normal, and she had never labored under cough. The operation was nephrectomy for stone in the kidney. The ether was preceded by nitrous oxid, but the preliminary anesthetic could have had no general influence at all upon the after-effects. The ether was given upon an Ormsby inhaler. There was no cough or strain, and recovery took place in the ordinary way. The evening of the operation the breathing was found to be moist, and in a couple of days bronchitis was distinctly present and ran on to bronchopneumonia. The bronchitis affected both lungs and the bronchopneumonia was at the left base. She died of pyemia consequent upon the original calculous disease. At the postmortem examination it was found that the lungs had undergone fibroid change as a result of bronchopneumonia, but the patient had died from other causes. It is not possible to affirm that in this case, if chloroform had been used, the bronchitis would not have arisen.

Hewitt then records another case in which dangerous symptoms came on after the administration of ether. The patient was a male, and ether was given for the dressing of a fracture of the femur. A considerable amount of mucus was secreted during administration. When the anesthetic was stopped the patient seemed about to vomit, and his jaws were clenched, and a good deal of cyanosis ensued because of the obstructed breathing incidental to beginning vomiting. The jaws were forced open, the tongue was drawn forward, and a finger was carried to the back of the throat, but respiration did not start. The house-surgeon performed tracheotomy, and a large amount of mucus escaped from the tube. This condition was undoubtedly due to the anesthetic, and we know that when certain types of individuals are emerging from anesthesia they may easily become asphyxiated. In this case the secretion of a large amount of mucus contributed to the obstruction of breathing. In cases where a large amount of mucus has been secreted it is wise to put the patient upon his side immediately upon cessation of the administration. The mucus

will flow out of the mouth, the tongue will drop into the cheek, and stertor will cease. The patient will recover from anesthesia in this position better than in any other. In this case the lateral posture could not be assumed because of the fracture. This case teaches how very important it is to watch a patient while he is emerging from anesthesia, and also how important it is that tracheotomy sometimes should be done when the anesthetic is given. Hewitt then mentions a case in which dangerous symptoms arose after giving nitrous-oxid gas. The child was 15 months old, and labored under an abscess of the neck. Nitrous oxid was administered, but breathing stopped, and there was a considerable amount of laryngeal spasm. This condition is not uncommon in giving nitrous oxid to very young children, for such cases are affected markedly by the absence of oxygen, and muscular spasm arises, which may interfere with respiration. The patient rapidly recovered.

The next case referred to by Hewitt occurred under chloroform. The patient was a male infant, 5 months old, on which circumcision was to be performed. Chloroform was given; after a time the pupils dilated and breathing ceased. The patient was restored by inversion, artificial respiration, and flagellation with a wet towel. The statement that small children take chloroform well is true, but once they have been brought under the influence of chloroform it is very easy to administer an overdose. It is often difficult to obtain the anesthetic state, because the vapor causes closure of the sensitive glottis, and a considerable time passes before enough chloroform enters the lungs; but once this stage is passed the anesthetic will be freely absorbed and but a very small quantity will be necessary. In the next case the symptoms were primarily due to the condition of the patient, and only secondarily to the chloroform. The patient was a female child, and tracheotomy was necessary for edema of the glottis. When a few breaths of chloroform had been administered the breathing ceased, the patient became asphyxiated, and the heart beat violently; but breathing soon recommenced when the trachea was opened and a tube introduced. In giving an anesthetic to such a patient the greatest care is necessary, and the greater the amount of cyanosis the more imperative is the necessity for caution, for in some of these cases breathing is only maintained by voluntary action, and natural sleep, save for very brief intervals, is altogether impossible. In such a state, when anesthesia is induced the patient has to fall back upon the ordinary muscles of respiration, which are probably insufficient to keep up breathing. For instance, if the patient has a large goiter which presses upon the trachea, and more particularly if general bronchitis is present, the use of any anesthetic may at once arrest the breathing, and because of the flattened state of the trachea it may be impossible to insert a tube. In such a case, before giving an anesthetic the surgeon must seriously consider the risks. If the case is such that insertion of a tracheotomy-tube is possible, it should be regarded in an entirely different way from one in which a tracheotomy-tube cannot be inserted, no matter how great the obstruction may be in either case. Hewitt then mentions a case in which ether was used at first and chloroform subsequently. The operation was nephrotomy on a man of 22, who was in fair condition. Ether was given on a Clover's inhaler, and the chloroform was administered on a Skinner's mask. When the ether was being given the patient coughed and struggled and the breathing was impaired, and a change to chloroform was made. During the manipulation and extraction of the kidney the pulse became feeble, and disappeared at the wrist for several minutes. Whenever the solar plexus is interfered with, reflex inhibition of the heart is common, although Hewitt is not aware that there is any case upon record in which it has been fatal, although he has known syncope to be so pro-

found as to arrest breathing for a while. In this case the breathing was not interfered with, but the pulse disappeared. At the end of this time the patient vomited and the pulse gradually returned. In such a case as this the operation is largely responsible and the anesthetic has but little influence. It is uncertain whether surgical shock is more apt to occur under ether than under chloroform. In renal operations one must always be on the watch for such symptoms. Be careful to see that breathing is performed and that only the necessary amount of anesthetic is given. This reflex shock is just as apt to occur during deep as during light anesthesia.

In the case of anxiety under nitrous oxid and ether the operation to be performed was for postnasal growths and enlarged tonsils, and under the influence of these mixed anesthetics the patient became cyanosed and respiration ceased. Artificial respiration was performed and the operation was completed under the A.-C.-E. mixture. In such a case as the above it is always well to remember that conditions are present which are apt to introduce an asphyxial element into the administration. When the tonsils are very greatly enlarged, so that natural breathing is difficult, nitrous oxid should never be given unless mixed with oxygen; but in cases of slighter enlargement there is no objection to the nitrous oxid *per se*, or as a preliminary to ether, provided that it is not pushed too strongly. It will be found that the patient becomes somewhat asphyxiated before he is really anesthetized, and at the time this is noted the inhaler must be removed, otherwise the breathing may be absolutely arrested. The sequence of nitrous oxid, ether, and chloroform is especially suitable for operations in and about the nose and throat, especially in children or in nervous or hysterical persons. The nitrous oxid quickly abolishes consciousness and prevents crying or struggling. The ether stimulates the circulation, so that it is able to withstand the strain that may be thrown upon it by intercurrent asphyxial states, and also makes it possible to charge up the patient, so to speak, with enough anesthetic to prevent him becoming semi-conscious during the insertion of the gag or the preliminary examination of the breast. The chloroform is valuable because it is convenient, and because it easily maintains a comparatively light anesthesia, which is advisable in these cases. If patients who labor under troubles with the nose and throat, and require operation, are first placed under ether, there is no objection to giving chloroform in the sitting posture, provided care is taken to avoid asphyxiation from faulty position of the head or accumulation of blood in the fauces. Only moderately deep anesthesia should be kept up. The two worst postures for operating upon the nose and throat and mouth are the semirecumbent, the body sloping out at about an angle of 45 degrees, and the dorsal, with the head completely extended over the end of the table. In the last case that Hewitt considers, posture was the primary cause of the trouble. The patient was a child of 5, with a growth of the scalp, and had to be placed in such a position that the chin pressed against the sternum. Such a posture is sure to lead to interference with breathing, because by it the tongue is forced back against the pharynx. In this case respiration ceased and artificial respiration had to be performed. As a general rule, the head should be kept as far as possible in a line with the body, no matter whether the patient is lying horizontally or on his side, or sitting in a chair. Rotation of the head does not interfere with breathing, providing that no flexion or extension occurs, but flexion of the head on the sternum or extension upon the spine is liable to induce difficulty. [The above admirable article is filled with practical points of the utmost value, and it should be read in full by all surgeons.]

C. H. Mollison¹ makes a further report on **postmortem notes of cases dead under anesthetics**. They comprise 3 deaths which occurred in the Melbourne Hospital. The first case was a woman, who was admitted with vomiting, due to strangulated umbilical hernia. She was placed under ether and operated upon. When the operation was completed she attempted to vomit, became cyanosed, respirations ceased, and a quantity of fecal matter came from her mouth and nose. The postmortem showed that there was congestion of the lungs and trachea. The mucous membrane of the trachea was dotted with hemorrhages, and the tube contained dirty mucus with a feculent smell. The heart was large and dilated and its muscle mottled and friable; the blood was dark and fluid. The second case was a man of 29, who was operated upon by Thiersch's method of skin-grafting, and who was anesthetized with a mixture of ether and chloroform. Just as the surgeon was ready to commence operating it was observed that the patient had ceased breathing. At the autopsy the following observations were made: There was a white froth about the mouth and nostrils; the blood was dark and fluid; the trachea and bronchi contained much froth, and their lining membrane was dark red, which became bright on exposure to air. The lungs were congested. The heart was markedly dilated, especially the right ventricle; the tricuspid orifice admitted two fingers and the mitral four; the muscular substance of the ventricles was relaxed; there was some atheroma of the aorta. The kidneys were granular and congested, and the other organs were congested. The last case was a man of 25, who had a gangrenous process of the face. He was anesthetized with a mixture of ether and chloroform, but died before an incision was made. At the postmortem it was found that the inflammation extended inward to the left tonsil, and there was edema of the left side of the epiglottis and of the left arytenoepiglottidean fold. The lungs, trachea, and bronchi were congested; the trachea contained dirty mucus. The blood was dark and fluid. The heart was somewhat dilated, and the right side distended with dark fluid blood. The liver and kidneys were congested; the kidneys were enlarged, and exhibited evidences of chronic Bright's disease. In these 3 cases death was due in each instance to a primary asphyxial condition from some cause or other, followed by failure of the enfeebled heart.

At a meeting of the Society of Anesthetists,² a discussion took place on the method of **treating emergencies under anesthetics**. Alexander Wilson said that the measures usually used could be classified under six headings: 1. External applications, including cold, Corrigan's cautery to the epigastric region, and ammonia vapor to the nostrils, all of which are means to excite respiration reflexly. 2. Reflex excitation of respiration by mechanical means, including rhythmic traction of the tongue and dilatation of the sphincter ani. 3. Stimulation of the heart by mechanical and electrical means, including acupuncture. 4. Artificial respiration. 5. Measures which antagonize circulatory failure, as posture and transfusion. 6. Various drugs, including amyl nitrite, strychnin, atropin, etc. The first and second classes are only useful when the nervous tissue is still sufficiently active to convey stimuli. If we are employing measures with the aim of stimulating the circulation, faradism to the cardiac region, hot and cold applications to the skin, and percussion over the heart are of no use. In failure of the circulation artificial respiration is an effectual measure. The influence of posture on the circulation is by no means clear, a good deal depending on the amount of arterial tone and the influence exerted by gravity. It seems likely that artificial respiration acts by removing the anesthetic vapor, by furnishing a supply of fresh

¹ Intercol. Med. Jour. Austral., Oct. 20, 1897.

² Lancet, Feb. 5, 1898.

air, and by favoring the circulation of blood. Inflation and the Silvester method are the most useful, but in some cases, especially in old people with rigid chests, faradization of the phrenic nerve is a very valuable procedure. When there is spasm of the larynx all these methods may fail. In circulatory failure inversion of the patient and abdominal pressure are to be employed. Wilson called attention to the danger of emptying the heart by the vertical position, since the cranial circulation was simultaneously drained. Transfusion is not altogether free from objection. Subcutaneous injection of drugs is open to certain objections. They will not be absorbed unless there is a certain amount of circulatory activity, and when a large dose is administered to a person apparently moribund, toxic symptoms may arise on resuscitation. In the debate on this paper Bowles said that too much was often done in trying to effect restoration of the patient. He believes that Marshall Hall's method of restoration was the best, as in this there is less danger of grumous matters, vomit, etc., being pumped into the air-passages. In a case in which there is pus or blood in the pleural cavity the affected side should be placed down and the Silvester method tried with one arm only, and the supine posture should be carefully avoided in such cases. When there is fluid in the lungs the procedure of resuscitation should be similar to that employed in an individual who is apparently drowned. Schäfer maintained that the respiratory, vasomotor, and other medullary centers are affected by an anesthetic almost simultaneously, although some may be more susceptible than others. At a certain period under the action of chloroform blood-pressure rapidly falls, and this fall goes on accompanied with paralysis of the respiratory center, while the heart's action grows weak in consequence of paralysis of the vasomotor center. In chloroform-poisoning particularly there is an evil effect upon the vasomotor centers. Mere respiratory failure can be easily combated, provided the circulation is unaffected. Blood charged with chloroform damages the muscular substance of the heart rather than its nervous mechanism. In the performance of artificial respiration the securing of expiration is most important. Diminution of the size of the pulmonary alveoli leads to inspiration. He advocated the use of atropin before the administration of chloroform, and believed that this drug prevents arterial dilatation and tends to counteract a dangerous fall of blood-pressure. The two drugs which most promote contraction of the arteries, and in consequence must antagonize the dangerous fall of blood-pressure produced by chloroform, are atropin and extract of suprarenal capsule. He has used atropin by intravascular injection, but has no doubt that hypodermic or intraserosus injection would do equally well. Extract of suprarenal capsule remarkably increases the rate and the force of the heart-beat. Silk believed the administration of strychnin a valuable prophylactic agent. Oxygen and forced artificial respiration he thought advantageous, and occasionally the actual kneading of the heart emptied it and did good. Barnard gave a *résumé* of Leonard Hill's views, and asked whether morphin should not be used as an adjuvant to chloroform. In chloroform-poisoning he has found the injection of ammonia into the circulation valuable. He considered hydrocyanic acid a dangerous drug. The President, Dudley Buxton, pointed out the fact that for many years morphin and chloroform had been used in conjunction, but the results had not been uniformly successful; and the late Sir Benjamin Ward Richardson had called attention years before to the value of the intravenous injection of ammonia. [In the above debate Wilson alluded to the administration of suprarenal extract before the giving of chloroform, to prevent the dangerous fall of blood-pressure which chloro-

form sometimes causes. This agent is believed by Mankowski¹ to be of use in treating chloroform-narcosis. He made experiments in dogs, injecting a 1% suprarenal extract into the jugular vein of animals laboring under chloroform-narcosis. He finds that it stimulates the heart and respiration and maintains the blood-pressure. He combines these injections with massage of the precordial region and subcutaneous injection of salt solution. Barnard considered hydrocyanic acid a dangerous antidote to chloroform. Frederick Hobday first advocated the use of hydrocyanic acid, and he strongly advocates it as a respiratory stimulant. He says that it is quicker than strychnin, and as safe. The acid is dropped on the back of the tongue. In an animal 1 mm. of Scheele's acid is used for every 7 or 8 pounds of body-weight.]

Thomas Annandale,² in discussing the **administration of anesthetics through a tracheal wound**, gives a description of the improvements which he has made in his well-known apparatus. In the new apparatus a full-size silver tracheotomy-tube, with its upper end extended about $\frac{1}{2}$ in. beyond its shield, is employed. There is a silver cap having a short tube of silver projecting at right angles, and to the small end of this cap a rubber tube can be connected. Fig. 5 shows the tracheotomy-tube with the

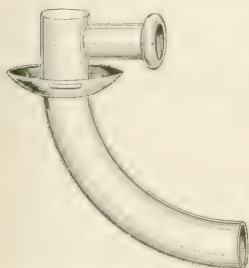


Fig. 5.—Tube with cap in position (Annandale, in *Lancet*, Nov. 6, 1897).

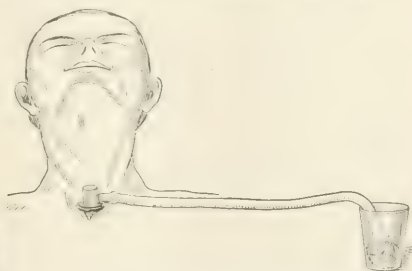


Fig. 6.—Cap connected with India-rubber tube dipping into vessel containing wool and anesthetic (Annandale, in *Lancet*, Nov. 6, 1897).

cap fitted upon it. This cap can be turned to either side, thus permitting the India-rubber tube to project on the side which will be most convenient to the operator. India-rubber tubing of the diameter of about $\frac{1}{2}$ in. is used. One end of this tube is fastened to the apparatus; the other end is placed in a tumbler containing a small piece of absorbent wool at the bottom, upon which chloroform or ether is from time to time sprinkled. The whole apparatus is shown in Fig. 6. Annandale prefers to use chloroform. In beginning the administration the cap is taken from the tracheal tube, and the chloroform is held directly over the tube until the patient is anesthetized, but when the time for operation has come the cap is put in place and the anesthetic is given as shown in Fig. 5. In order to prevent blood or vomited matters entering the air-passages, it may be advisable to introduce a piece of sponge into the trachea above the tracheotomy-wound. In the case of excision of the larynx Annandale adopted an original method. Immediately above the tracheotomy-wound he surrounded the trachea with an India-rubber cord, and by means of it he ligated the canal temporarily, thus completely prevent-

¹ *Russ. Arch. f. Path.*, vols. iii. and iv, 1897.

² *Lancet*, Nov. 6, 1897.

ing the entrance of any fluid into the air-passages. At the termination of the operation the rubber cord was removed; the walls of the trachea did not seem to have been injured. It is true that in some instances the condition of the tracheal rings may militate against the complete success of such a method, but he is of the opinion that temporary closure of the trachea is certainly worthy of trial.

In an editorial in the *Med. News*, Jan. 22, 1898, a plea is made for **chloroform-anesthesia**. The writer states that the general use of Schleich's general anesthetic mixture does not give confidence in its absolute safety. Its great volatility, or some as yet unknown quality, seems suddenly to overwhelm the patient, producing great pallor and frequency of the pulse, and in one or two cases it has been necessary to suspend it and substitute ether. The value of this mixture is still undetermined.

Pringle disputes the assertion recently made that even in Edinburgh, the home of chloroform, surgeons are becoming afraid of its use. He says this is not true. In Edinburgh there are no special anesthetists, and the anesthetic is given by any house-surgeon or student. Two persons superintend the administration. Chloroform is given by the open method of Syme; students are taught to watch the breathing, and not to give chloroform with the finger on the pulse. An ordinary smooth hospital-towel is made into a cone, an opening large enough to admit two fingers being left at the apex. The anesthetist, with the fingers of the left hand, holds the lower jaw forward, and keeps the thumb in front of the mouth to feel the breathing. The chloroform is dropped on the upper part of the inside of the cone, and the patient is bound to receive a considerable amount of air mixed with chloroform. Pringle kept a record of 500 instances. Leaving out of consideration 2 alcoholics, 22 of these took chloroform badly. In both these cases drawing the tongue forward and clearing the throat restored respiration. In 21 deaths from chloroform occurring in recent years the operation was usually of a trivial nature, such as the extraction of a tooth, or tonsillotomy. In 16 of these cases a mask-inhaler or lint was used. Pringle regards the inhaler as dangerous. He says that any apparatus for giving chloroform is an abomination. When an inhaler is used there is danger of asphyxia, and the patient may inhale bacteria deposited there by the exhalations of some preceding patient. The air-bag of a Clover inhaler which has been used frequently contains numbers of bacteria, and if the patient has weak lungs may do infinite harm. Pringle asserts, and with truth, that the duty of medical schools is to teach thoroughly the administration of chloroform. Just so long as they teach the administration of ether, but do not teach the giving of chloroform, maintaining that it is only to be used in exceptional cases because it is dangerous, just so long will there be a high death-rate from this agent, for so long as chloroform continues to be the most pleasant and convenient anesthetic, just so long will it continue to be used. Before receiving his diploma every student should be obliged to produce a certificate showing that he has personally given chloroform to a certain number of cases. When this is done deaths will become rarer, for every one agrees that many deaths are due to overdosing with the drug. [The fact that the pulse should be watched is emphasized by Heurtl in a preceding article. The condition of the pulse may show us if the patient is getting an overdose, and show us before there are any respiratory phenomena. It is unquestionably necessary to teach students to give chloroform, but if a patient dies in the teaching the institution will be harried by that peculiar and inscrutable being, the American political coroner, who in some cities has always assumed the right to say what anesthetic should

be given and when. The records are strongly against chloroform as a routine anesthetic. H. Bellamy Gardner has recently presented the statistics of thousands of cases to prove the relatively greater safety of ether.¹ In 22,219 chloroform-administrations there were 14 deaths. In 17,067 administrations of ether, or gas and ether, there was 1 death.]

Wilson² writes on **the mechanism of death from chloroform**. In 1893 he described 3 cases of death from chloroform in which the prominent symptom was persistence of respiration when the pulse had become imperceptible. He compared the symptoms in these cases with similar ones occurring, respectively, in death from sudden hemorrhage, cardiac syncope, and peritonitis, and suggested that these fatalities were due to anemia of the respiratory center, produced by failure of circulation from either vasomotor paralysis or cardiac syncope, and not by a primary paralysis of the respiratory center. Since then he has met with 3 like cases, 1 happily not dying, and he has received the reports of 2 fatal cases from friends. He states that cases of this class are very important, because they are not understood, and signs which are evidence of grave trouble are often looked upon as evidences of safety. The indications of danger are the same as the classical symptoms of death from hemorrhage, but are more or less masked by the amount of the anesthetic, and are caused by a failure of the respiration producing sudden anemia of the vital centers in the medulla. For instance, in 1 of his cases the respirations suddenly became rapid and deep, expressive of extreme air-hunger, the pupils dilated widely, the pulse became feeble and almost imperceptible, and the skin became deadly pale. In 1 case the patient began to breathe very deeply, and, although the face was pale, the anesthetist was reassured by the free respiration; but the respiration suddenly ceased, and all efforts at resuscitation failed. In 1 case, when an incision was made it was found that there was no hemorrhage. This first drew attention to the pulse, because throughout the administration of the anesthetic the respiration had been going on freely. The respiration soon ceased and a fatal result ensued. The indications for treatment are: to get the blood to the respiratory center, to stimulate the heart, and to restore the blood-pressure. For this purpose intermittent compression of the chest, such as is obtained in artificial respiration, is of great value. It is not enough to get air in and out of the lungs by inflation or faradization of the phrenic nerves; the chest must be compressed so that pressure acts upon the heart. If the chest-wall is rigid, pressure must be made upon the epigastrium in the direction of the heart. Wilson then cites 2 cases to show the value of compression on the failing heart. Artificial respiration not only stimulates the heart, but restores the blood-pressure. The Hyderabad Commission found that when the animal was really dead, in some cases artificial respiration still maintained a small mean pressure in the manometer. Wilson has seen a case in a child in which, from the ruddy complexion and the red lips, the color having actually returned after pressure, a certain amount of blood-pressure was kept up by artificial respiration, when the patient was actually dead. The fact that artificial respiration is useful to stimulate the circulation, as well as to get air into the lungs, shows that it should be employed at once, before waiting for the cessation of deep respirations. If we delay treatment until the respiration ceases, we wait until the vital centers have been so badly damaged that they cannot recover. In other words, we wait until death is inevitable. The value of artificial respiration in chloroform-poisoning lies chiefly, if not entirely, in its effect as a mechanical cardiac stimulant and restorer of the blood-pressure, and if it is to be effectual.

¹ Brit. Med. Jour., Aug. 21, 1897.

² Lancet, Sept. 11, 1897

it must be used so as to compress the chest. The above theory explains the mechanism of some anomalous deaths from chloroform. It explains the cause of trouble in that class in which there is spasmodic contraction of some or all the muscles. A number of these cases have been reported. This muscular spasm may vary from a mere trismus, with fixation of the chest, to general convulsions which resemble epilepsy. An anemia of the respiratory and other centers, which in a conscious man would produce general convulsions, in an anesthetized man will be apt to cause symptoms affecting only a series of muscles not under the influence of the anesthetic. The various voluntary muscles and muscular systems of the body, the jaw-muscles, and certain face-muscles are affected late, and the respiratory muscles last of all. A patient may be sufficiently unconscious for the performance of a surgical operation while a number of muscles are unaffected and still capable of responding to natural stimuli. When death does happen from chloroform it is not due to regular progressive narcotic action of the drug, as is the case in poisoning by opium, but is due to sudden excessive action on the vital center, or to paralysis of the center secondarily and to weakening or death of another. This is proved by the fact that death may happen, and does happen, at any stage of anesthesia, and the symptoms vary according to the stage. This death is always from failure of the circulation, and the widely divergent symptoms attending dissolution depend upon the degree of narcosis present when the failure of circulation has reached a point which renders impossible the proper nutrition of the vital centers. The signs of danger have to be read from the organs which are left intact to give them. If failure of circulation takes place early, before the general muscular system is narcotized, it will be indicated by accelerated respiration, dilated pupils, and general convulsions resembling epilepsy, the symptoms terminating with deep, gasping respiration, ceasing suddenly. Wilson reports a fatal case of this nature. If the degree of narcosis is still deeper when the failure of circulation takes place, the anesthetized muscular system will not respond as a whole; there will then be no general convulsions, but only spasm and disordered action of the muscles which are least involved. There will be clenching of the jaws and rigidity of the chest-muscles. The author quotes a case of this description from Snow. Failure occurring at the stage of ordinary surgical anesthesia, when all the muscles are relaxed excepting those of the respiratory system, will be indicated by exaggerated respiratory movements and dilated pupils. If death occurs without any exaggeration of respiration, the anesthetic has been gradually absorbed, so as to paralyze the respiratory center and render it incapable of expressing its condition of anemia by its normal method—that is, by exaggerated respiratory movements. What is this failure of circulation which causes anemia of the centers? Wilson, in his previous paper, suggested that it is due to vasomotor or cardiac paralysis. He inclines to the former view. In some notes on the Hyderabad Commission he pointed out that if their experiments prove anything at all, they prove that the chief danger from chloroform was the induction of vasomotor paralysis. Hare, in a recent paper, shows that the one point on which all laboratory experiments agree is that the inhalation of chloroform causes a fall of blood-pressure, and the researches of Leonard Hill confirm this view. How far the heart contributes to the fatal result by its own weakness, or by being affected by the anesthetic, is an unsolved problem.

Alexander Haig has ably advocated the theory that in the rise of blood-pressure which follows the cessation of chloroform-inhalations the weakened heart is overwhelmed by the high pressure, but this certainly does not explain

a majority of cases. There can be no doubt that most, if not all, cases of death from chloroform are due to vasomotor paralysis, or at least the fatal changes are started by the fall in blood-pressure. The symptoms preceding death vary according to the degree of narcosis. It is important to know what means can be used for estimating the blood-pressure in a patient under chloroform. The heart and the pulse are uncertain guides, for as the pressure falls the heart beats more vigorously in endeavoring to maintain a normal pressure, and what at first sight may appear to be a good pulse may be simply an effort on the part of the heart to restore the falling blood-pressure. The pulse must be considered in conjunction with other signs. The color of the patient in itself is not of much help, because many persons who are perfectly healthy are deadly pale, and many with feeble circulations may have a color; the fact is, even a dead person may have a color. The best index of the condition of the blood is the capillary circulation; the best way of testing this is by pressing on the lips or gums, releasing the pressure, and noticing how rapidly the blood returns. Capillary circulation is a matter of blood-pressure. If blood returns rapidly, the pressure is good; if it returns slowly, the pressure is low. Some information can be obtained from the way blood stagnates in dependent parts, such as the dependent portions of the cheek and the ear. There are many minor signs which should be studied: movements of the *alæ* of the nose and the facial muscles, alterations of rhythm, respiration, etc.; all of these indicating some change in the patient's condition. The first indication of a failing circulation may be yawning. Signs such as these are of more value than mere rate, volume, etc., of the pulse, as they show to what extent the circulation is being efficiently performed and is really effective.

D. E. Keefe¹ discusses **chloroform and ether**, and makes a criticism of Leonard Hill's address, and his conclusions are: 1. That statistics are of little value in deciding as to the relative danger of chloroform and ether, because the deaths under both agents bear a lower ratio to the inhalations than do the sudden deaths in those who had not taken an anesthetic bear to the population. 2. Ether is a safer anesthetic in proportion as being weaker, bearing a relation to chloroform of about 1:5. The danger of chloroform is not inherent in it *per se*, but is due to its greater strength and to the greater care necessary for its administration. Almost any physician may be trusted to give ether, but not 1 in 20 should be trusted to give chloroform. 3. The trouble with chloroform and ether in the presoporous stage is, in nearly all cases, due to respiratory spasm and the consequent heightened arterial tension and venous congestion. Because of recumbency, this is apt to be especially marked in the brain. The brain is not so well able to resist the onset by contracting its arteries or by emptying itself. 4. In the poststertorous stage, after long application, death is probably due to anemia and cardiac paralysis. 5. The best remedy for the first kind of trouble is amyl nitrite, belladonna, and strychnin; and for the second, digitalis and strychnin, with electricity and the movements recommended by Hill. 6. If the author were asked for the greatest advantage that ether possesses over chloroform, he would say that the anesthesia of ether is loud and lifelike, and any action or trouble is instantly noticeable; whereas chloroform produces a quiet sleep, and there is no very decisive warning of accident until too late, and consequently the administration of chloroform requires a high degree of vigilance. 7. Chloroform is a more satisfactory anesthetic for short operations, where the sopor need not be renewed or continued; for obstetrics, where the anesthesia need not be complete; and for patients with lung- or kidney-disease, and children. 8. It is pleasanter

¹ Boston M. and S. Jour., Dec. 23, 1897.

and safer for most physicians to continue the anesthetic state with ether after having induced it by chloroform. 9. There is no well-marked difference in the manner of death under ether or chloroform; the stage of anesthesia has more to do with the phenomena than has the agent.

J. Frederick Silk¹ writes on the diagnosis and treatment of the early stages of **ether-narcosis**. There are two methods of giving ether. By one method a nearly open inhaler is employed, and very large quantities of ether are used: the patient, as a rule, struggles violently, and it is certain that this method is asphyxial in character. It is claimed for this plan that it is rapid, and in consequence is more humane; but it cannot be recommended to the novice. In the other method a closed inhaler is used and anesthesia is gradually induced, the strength of the vapor being graded. If the Clover inhaler is employed after the patient has become accustomed to the face-piece, the ether-chamber ought not to be moved more than $\frac{1}{8}$ to $\frac{1}{6}$ in. at a time during inspiration. After 2 or 3 movements to this extent have been made, the excursion of the chamber may be extended from $\frac{1}{4}$ to $\frac{1}{2}$ in., and finally to $\frac{1}{2}$ in. It is seldom necessary to carry the index beyond the mark 3, and about 5 minutes will usually be enough to produce anesthesia. If the Ormsby inhaler is used, care must be taken to approach the face-piece to the face very gradually. Another important matter is connected with the excessive secretion of mucus and saliva which almost necessarily follows the use of ether. Because of this, as soon as the muscles of the neck are relaxed the head should be turned to one side, when much of the fluid will run out of the mouth or will collect in the dependent cheek, and can be removed with a sponge or corner of a towel. Fully half of the difficulty of ether-administration results from the accumulation of fluid in the trachea and bronchi, and the plan outlined will avoid to a great degree this trouble. The accumulation of mucus may produce lividity. Many hold that ether-narcosis inevitably produces intense lividity, but Silk vigorously protests against such a doctrine. Intense lividity means either that the patient ought never to have had ether, or that the administration has been faulty. The prime factor in the production of lividity is the accumulation of mucus in the throat. Lividity will in itself intensify the production of the excessive flow of mucoid fluid. If the patient has become insensible, the normal color of the face may be preserved. Whenever this color shows signs of blueness the face-piece should be raised and air admitted. Only enough ether should be given to keep the patient under its influence. It is here where judgment and experience come in. In operations performed upon the abdominal and rectal regions or upon large joints, or where operative shock is to be feared, the patient must be profoundly anesthetized; but in the majority of cases anesthesia need not be nearly so deep. After the patient has been taking an anesthetic for some time his blood becomes saturated with it, and all that is then necessary to do is to maintain the condition, bearing in mind that elimination is very much retarded. It is idle to maintain that there is no risk of bronchial affections after the use of ether. To give ether, for instance, for such a procedure as to reduce a dislocation, and then to send the patient out into the cold night-air immediately after, is simply to court disaster. Because pneumonia arises is not an indictment of the drug. When the patient is recovering from an operation, it matters not what anesthetic has been employed, he should be placed in a warm bed in a warm room and screened from draughts. If these precautions are taken there is scarcely more risk of bronchial trouble after ether than after other substances.

Augustus D. Waller² writes on **the dosage of chloroform**. He

¹ Treatment, Nov. 25, 1897.

² Brit. Med. Jour., Apr. 23, 1898.

believes that chloroform can be administered with much greater safety than is usual at the present time. He maintains that it should never be employed as a routine anesthetic in all sorts of cases simply because it is convenient. The author is persuaded that the quantity of chloroform is a factor in anesthesia and in the production of death. He believes that the effects of chloroform-vapor are trivial or grave according as it is present in small or great quantity, and that anesthesia is best conducted by a mixture of chloroform and air at an average percentage of $1\frac{1}{2}$, not below 1 and not over 2. The best methods of obtaining this percentage are the method of Junker and the open method. The Junker apparatus should be arranged to deliver a minim of fluid chloroform at each stroke of the piston. The large opening in the face-piece permits free respiration, and at the beginning of inspiration the stroke of the piston is to be made to drive into the face-piece the vapor of a minim of chloroform. By the open method an evaporating-surface is held at a distance from the patient's face, so that the chloroform-vapor which falls shall become mixed with air and the patient inspire a mixture of 1 part of chloroform-vapor in 100 parts of air. This proportion of 1 part in 100 is the one to be aimed for. The open method is, of course, less accurate than the method by the Junker apparatus. If chloroform is given by this method, it is not an uncertain drug. The so-called uncertainty and danger are simply uncertainty in the amount administered. The greatest danger of the open method is the giving of an overdose.

Robert Ballard¹ maintains that **mental factors** may be influential causes in the production of chloroform-death. It is beyond doubt, the author says, that fear and anxiety may cause profound circulatory disturbance, and that this condition may predispose to danger when an anesthetic is given. In such case a hypodermic injection of morphin should be administered, and if there is no contraindication to it ether should be employed instead of chloroform.

J. M. Anders² discussed **ether-pneumonia** at the Denver meeting of the American Medical Association. He says that it occurs once in about every 300 cases, and the condition is often overlooked because the pyrexia is slight or irregular. It is not probable that the causative microorganisms of pneumonia are obtained from the inhaler, but it is probable that dried secretions are loosened by the moisture in consequence of the mucous flow caused by the irritating effects of ether, and that these dried secretions are drawn into the lungs. In the vast majority of cases bronchitis, coryza, or some other inflammatory state of the respiratory mucous membrane existed before the anesthetic was given. Such predisposing causes should be removed, if possible, before anesthesia. The majority of cases occur in cold weather, when the patient, it may be, is carried from a warm operating-room through a cold corridor; in many of these cases it seems likely that too much ether has been given.

M. L. Maduro³ writes on **Schleich's new method of anesthesia**. Schleich maintains that anesthetics in small doses are excitants, in large doses induce sleep, and in the largest dose cause death. A narcotic which evaporates quickly is eliminated quickly by the respiratory organs, and one which evaporates slowly remains longer in the system, and becomes dangerous with prolonged inhalation. The lower the boiling-point of the body, the more rapidly the narcotic evaporates, and *vice versa*. The question arises, What is the relation between the boiling-points of various narcotics and the temperature of the organism by which they are absorbed? A narcotic with a boiling-point of 15° C. (ethyl chlorid), or one which boils at 65° C. (chloroform), must act

¹ Lancet, May 7, 1898.

² Phila. Med. Jour., June 18, 1898.

³ Med. News, Nov. 27, 1897.

in a different manner upon an organism the temperature of which is 38°C . Schleich endeavored to discover a mixture which would satisfy the relation between the boiling-point and the temperature of the body, and thus lessen the dangers of general anesthesia. He found that when the boiling-point is higher than the body-temperature, the amount necessary to secure anesthesia is less than when the boiling-point equals the body-temperature. Further, when the boiling-point is higher than the body-temperature the resulting narcosis is deeper. The boiling-point of chloroform is 65°C ., of ethyl bromid 39°C ., and of sulphuric ether 34°C . We can now understand why it is that less chloroform is necessary to anesthetize than ether, and why chloroform-unconsciousness is deeper than that of ether. Schleich has proved that anesthesia with ethyl bromid would be ideal were it not that the advantage of boiling-point is not sufficient to overcome the dangerous effect of the bromin. After a series of experiments Schleich decided that it is possible to change the boiling-point to the desired degree, and that the mixture will continue to boil without decomposition as long as its temperature is not considerably higher than its determined boiling-point. Mixtures of ether, the boiling-point of which closely approaches the temperature of the body, absorbed during respiration will boil when expired with the air in the lungs. It is possible to mix ethers having different boiling-points in various proportions, and thus obtain a desired boiling-point, and to regulate it according to the proportion of each used. Schleich has recommended the use of three mixtures for the production of general anesthesia :

Mixture I. (Boiling-point, 38°C .)

Chloroform,	45 parts ;
Petroleum-ether,	15 parts ;
Sulphuric ether,	180 parts.

Mixture II. (Boiling-point, 40°C .)

Chloroform,	45 parts ;
Petroleum-ether,	15 parts ;
Sulphuric ether,	150 parts.

Mixture III. (Boiling-point, 42°C .)

Chloroform,	30 parts ;
Petroleum-ether,	15 parts ;
Sulphuric ether,	80 parts.

These mixtures can be prepared by the anesthetizer. The petroleum-ether used should have a boiling-point between 60° and 65°C . The advantage of petroleum-ether is that there is no other substance that can be administered in such large doses without causing serious disturbances. It mitigates the action of the chloroform and dilutes the other materials, and does not interfere with their actions. The anesthetic is given practically in the same manner as other anesthetics. The greatest care as to the amount used must be observed, and small doses will produce slow but certain results. Of Mixture I., 30 gm. would be an average dose for 20 minutes or less. Schleich used for a while a special mask, but he has given it up, and uses with equally good results the practical American idea of the paper-and-towel combination. If a more prolonged operation is to be undertaken, a higher boiling-point is selected (Mixture I. or II.); for then the small excess which cannot be immediately eliminated with the expired air will produce profound sleep with a small dose.

When this method is employed the narcosis can be regulated by the respirations alone. Schleich finds it possible to have patients who are under a brief narcosis immediately awake after the completion of the operation; for if Mixture I. is used, only a few respirations are necessary to awaken the patient. By the Schleich method the patient becomes anesthetized quickly and recovers rapidly from the anesthetic. After an average of 5 minutes of administration the abdominal muscles are relaxed. The stage of excitement is rare, even in the alcoholic, and cyanosis or nausea is very unusual. The after-effect is about as frequent as with the use of chloroform. There is neither salivation nor bronchitis. The pulse remains good, and after the administration of Schleich's anesthetic the patient wakes feeling more refreshed than if he had taken ether or chloroform. Schleich has collected 360 cases in which he used this method with uniformly favorable results. There is no doubt in the mind of Madura that this new method will practically revolutionize older methods, and will be generally adopted in the near future.

Stillman and Greeley¹ report 44 cases anesthetized by Schleich's method. The average duration of operation was 52 minutes. The average amount of anesthetic used for each patient was $3\frac{1}{2}$ oz., $\frac{7}{8}$ oz. being necessary to produce anesthesia, and the time necessary for production being an average of about 10 minutes. Patients recover consciousness in about 14 minutes. During the following 24 hours 18 were nauseated, 3 of them more so than after ether-administrations at former operations. In 1 case during recovery there was excitement for half an hour. Three cases needed stimulation, and in 1 of these Schleich's anesthetic was stopped and ether substituted, because of the weak pulse. In general, both the pulse and color were good; in the earlier cases less so than in the later, because the vapor was too concentrated. The muscular reflexes were difficult to control with Mixture I., and Mixture II. or III. should be used in a larger proportion of cases. The inhaler used was that of Esmarch, covered with a single thickness each of gauze, flannel, and oiled muslin. The majority of the patients received the customary hypodermic of $\frac{1}{8}$ gr. of morphin and $\frac{1}{150}$ gr. of atropin half an hour before operation.

A. E. Engzelius² makes a report on 56 cases in which Schleich's anesthetic-mixture was employed. Vomiting was absent, the stage of excitement was of brief duration, and there was only moderate cyanosis. The longest operation lasted about 2 hours, and required 4 oz. of Mixture III. The largest amount used in one operation was 4 oz. of Mixture I.

J. Torrance Rugh³ recommends inhalations of **vinegar to control nausea** and vomiting after anesthesia. He says that this method is simple and most satisfactory, and was first introduced by Mackenrodt. Lewin maintains that its beneficial action in chloroform-vomiting is due to the fact that it neutralizes free chlorin, one of the products of chloroform, by the acetic acid. The chlorin acts as a marked irritant to the pharyngeal mucous membrane and induces vomiting, but it is neutralized by the acid, which soothes the irritated parts as well. Ether, however, is much more directly irritating to the respiratory passages than is chloroform, but vinegar gives just as satisfactory results after ether as after chloroform. The simplest explanation of its beneficial effect is that its pungency stimulates the respiratory mucous membrane and promotes the normal secretions, and its soothing action upon the peripheral nerves of the parts lessens the irritability of the pneumogastric or its centers, and the reflex condition of vomiting is controlled. Vinegar is a restorative and soothing stimulant to the respiratory tract and the nervous

¹ Med. Rec., Apr. 2, 1898.

² Ibid., June 11, 1898.

³ Phila. Polyclinic, Feb. 26, 1898.

system. This has been recognized for many years by those who use vinaigrettes instead of smelling-salts. In cases which have been properly prepared for operation, and whose stomachs have not been filled with blood during operation, it almost, if not completely, prevents vomiting. It is given by saturating a towel or cloth with fresh, strong vinegar, preferably that made from cider, and holding it a few inches above the patient's face, or hanging it from the bedstead, so that it will be near his head. It should be used immediately after the anesthetic has been discontinued, and kept up continuously for hours. It also greatly relieves a patient's thirst and refreshes him. It is free from toxic effects and can occasion no harm.

F. C. Wallis¹ writes on the **hypodermic use of eucain** as a local anesthetic. He uses a 4% solution, and has never seen any toxic effect except in 1 doubtful case. Eucain is only slightly soluble in cold water, but is freely soluble in hot water or boiling water, and boiling sterilizes the solution of eucain, and does not alter the composition of the drug. Such a solution, however, should not be used after the third day; it is then not so markedly anesthetic as when fresh. The amount used depends upon the extent of the operation. Wallis has injected as much as $3\frac{1}{2}$ to 4 drams subcutaneously without any ill-effects in a large ischiorectal abscess. An ordinary minor operation requires 1 or $1\frac{1}{2}$ drams of the 4% solution, but the operator need not be apprehensive if he uses larger amounts. The syringe employed should have a needle screwing upon the nozzle, and upon the nozzle a washer. The syringe and needle should be thoroughly sterilized. Before the injection the needle is shown to the patient, and he is informed that he will feel a stick. If he is not told this, he is liable to jump when the needle is introduced, and the procedure must be repeated. The needle is carried into the epidermis, and about 10 minims of the solution introduced. In 3 or 4 seconds the needle is pushed on into the subcutaneous tissue in a line in which the incision is to be made, and more of the eucain is introduced. When one syringe-ful has been used, if more is required, the needle is withdrawn, the syringe is recharged, and the needle is again inserted $\frac{1}{2}$ in. in front of the last puncture, and is thus pushed in through the anesthetic area. It is usually safe to make a second injection within a minute after the first. When eucain is injected into the epidermis of inflamed tissues the first injection causes pain, but this pain lasts for only a second or two. There was only 1 doubtful case of possible after-effects from eucain, a patient laboring under ischiorectal abscess, which had burst. Wallis injected 20 to 30 minims of the 4% solution and enlarged the opening. When the patient arose from the table he became very pale and faint, and perspired freely. There was no evidence that this effect was due to the drug, and inquiry elicited the fact that the patient had often had similar attacks. From 20 to 25 minutes is about as long as a surgeon can count on the anesthesia lasting. Another advantage of eucain is that it is cheaper than cocain. [The editors believe that the anesthesia induced by eucain lasts longer than that produced by cocain and is just as complete. The drug is less toxic than cocain; but, as we have stated before, in some cases it leads to sloughing. It has been suggested that a combination of eucain and cocain is superior to either drug alone, but we have had no experience with it.]

Dwight S. Moore² records a case in which he amputated a leg at the junction of the lower and middle thirds under eucain-anesthesia. Only twice during the operation did the patient complain of pain, or rather of a smarting sensation following the use of the knife. Primary union was obtained in the stump.

¹ St. Bartholomew's Hosp. Rep., Aug., 1897.

² Jour. Am. Med. Assoc., Apr. 30, 1898.

J. Shelton Horsley¹ writes on **cocain in surgery**. He says that the danger of constitutional effects was at first underrated and the usefulness of the drug was overrated; then the danger was exaggerated, but now it seems that the pendulum has swung to a happy medium. It may be of interest to consider briefly the rivals of cocain in anesthesia. Cold, in the form of sprays of ether, ethyl chlorid, etc., is usually difficult to apply, is followed by pain after the operation is completed, and can only be used with success on the extremities, where the circulation can be controlled. It is sometimes useful in opening boils and in other operations upon the skin. Eucain is being much praised; the chief advantage claimed for it is its safety, but this is a much-mooted point. Horsley says that because an injection of 2 drams of a 4% solution of cocain produces a fatal result, it is not evidence that cocain should be abandoned. The maximum dose for hypodermic use is usually 1 gr., and in a case reported in the *N. Y. Med. Times* of May, 1897, 5 gr. were employed. It would be just as reasonable to abandon the use of common salt because half a pound taken at once might kill. It has been certainly ascertained that eucain produces local hyperemia, and so brings a large amount of blood into the field of operation, and this must detract from its merits. Cocain has the opposite effect. Recent investigations would indicate that eucain is more dangerous than cocain, for in cocain-poisoning there are premonitory symptoms, but eucain may at once overwhelm the patient. As for keeping a solution free from fungus, this can be readily done by dissolving it in a saturated solution of boric acid, which will remain sterile indefinitely. The only superiority of eucain over cocain is in ophthalmic work, and this superiority lies in the fact that it produces anesthesia on being applied to the conjunctiva, but does not produce mydriasis and disturbance of accommodation, as cocain does. But in the light of recent investigations by Reclus and Pouchet eucain cannot be said to be superior in any other action to cocain, while in many respects it is inferior, if cocain is used properly. A great many major operations have been performed under cocain, but in attempting these the personal equation must be considered. As a rule, a nervous, timid person may require general anesthesia for an operation which could be readily performed on a calm or phlegmatic person with cocain. Idiosyncrasy for cocain is an uncertain factor, and until it can be certainly detected the drug should be used with extreme caution. The only valuable fact in being able to state that there is idiosyncrasy is a history of its previous use on the same patient, because bad symptoms may occur in any sort of patients, the strong and muscular, weak and nervous, being equally liable. There is little danger if a weak solution or small quantities are used until the tolerance of the individual be established. Toxic symptoms are loquacity, tingling in the extremities, pallor, cold perspiration, shallow respiration, rapid and feeble pulse, occasional vomiting, unconsciousness, and convulsions. Mild symptoms of cocain-poisoning resemble the evidences of shock, and these two conditions are frequently confounded. The best treatment is the hypodermic injection of morphin. The next best treatment is the injection of ether, strychnin, or whiskey. The head should be lowered, the patient kept warm, and artificial respiration employed, if necessary. In fatal cases the respiration fails before the heart. Cocain may be used in surgery by a local application and hypodermic injection, and by galvanic current. Cocain cannot be absorbed through unbroken skin; but from mucous surfaces, the eye, or where the skin is broken it can be readily absorbed. It is absorbed rapidly when dropped into the eye; more slowly from mucous membranes. It is well to apply it, when possible, on a sponge or piece of cotton.

¹ N. Y. Med. Jour., Sept. 15, 1897.

This is better than spraying a wide area with a 4% solution. Granulations, if intact, absorb cocain very slightly; if they are damaged, however, they will absorb it very rapidly, and especially if the application is accompanied by pressure. As both of these conditions are present when using cocain in passing sounds to dilate urethral stricture which has recently been cut, only a 2% solution should be used for such operations. In cutting strictures of the urethra an 8% solution should be injected with an ordinary glass syringe, and retained by compressing the meatus for 5 minutes; or a 4% solution may be retained for 10 minutes. Within the bladder a large quantity of strong solution may be used safely if no abrasion exists in that organ, because the mucous membrane of the bladder absorbs cocain very slowly. A fresh wound which is not bleeding absorbs cocain very rapidly; but if hemorrhage is going on, the blood washes away the drug and but little of the alkaloid is absorbed. The surface to which cocain is to be applied should be cleansed with boric-acid solution. This cleanses the field and partially fills the lymphatics, thus preventing excessive absorption of the cocain solution. Hypodermic injections must be used most carefully. Most surgeons use too strong a solution and too much of the drug. If injected properly, 3 minims will enable the surgeon to make a skin-incision 3 in. long without pain. A very fine needle is used with a 2% or 4% solution of hydrochlorate of cocain. The needle is inserted just beneath the skin and a half minim injected, which produces a white, bloodless spot. After waiting a few seconds the direction of the needle is changed so that it is parallel with the surface to be operated upon. The needle is now shoved along in the deeper layers of the skin for half an inch and half a minim again injected; shoved another half-inch, and another half-minim injected. Then the needle may be withdrawn and reinserted at the point of the last injection, and pushed along as before. As soon as the needle is withdrawn for the last time the incision may be begun. After cutting through the skin Schleich's solution may be used with entire satisfaction. This solution is made in three strengths, called the strong, the normal, and the weak, and it will be seen that the strong solution contains only 3 gr. of cocain in 3½ oz.; and all of them contain morphin, which counteracts the toxic effect of cocain and serves to increase the anesthetic effect. When Schleich's fluid is first injected into the substance of the skin it forms a white anesthetic wheal, at the edge of which another injection may be made. The strong and the normal are the only strengths used, and will be found particularly safe.

Injection of cocain by the galvanic current was inaugurated in this country by J. Leonard Corning. He perforates the region to be anesthetized with a large number of fine needles, that spring out after the manner of the old-fashioned lancet. The needles must be so small that when they are withdrawn their punctures will be invisible to the naked eye. The perforated area is now covered with several thicknesses of flannel cloth saturated with a 5% aqueous solution of cocain hydrochlorate; a layer of potter's clay, about the consistence of bread-dough and containing a thin copper sheet, is placed on the flannel and the copper connected by the insulated wire with the positive pole of a galvanic battery. The negative pole should consist of a broad, flat sponge wrung out of warm water, and held as near the positive pole as possible without actually touching it. The larger the area to be anesthetized the stronger must be the current. About the head and face 3 to 6 cells may be used, beginning at the smaller number and gradually increasing, and the time of application may be from 10 to 20 minutes to obtain perfect anesthesia. If cocain is used in selected operations after the plans above described, it is practically without danger.

Honigman¹ maintains that the **infiltration-method** should not be used in inflamed tissues. In such conditions he employs the method of Oberst. This method is applied as follows: The extremity is elevated until it becomes practically bloodless, and then above the field of operation is constricted tightly with an elastic band. A quarter to half a hypodermic needleful of 1% cocain solution is injected below the point of constriction, the needle being pointed toward the periphery. This method gives complete anesthesia as long as the circulation is cut off by the elastic band. [Otto Manz² puts an elastic band around the extremity and injects cocain below the band, so as to paralyze the nerves of the extremity. A long needle is required; it is entered on the peripheral side of the band and in the direction of the sensory nerves. A 1% solution is used. In a finger or toe 20 to 30 minims will produce complete anesthesia. Krecke³ states that the infiltration-method should not be used in inflamed tissues, in cases of carcinoma where glands must be removed, or in ingrowing toenail; but should be used in phimosis, in some tracheotomies and laparotomies, in secondary suture, in plastic operations, in the removal of small tumors and foreign bodies, and in scraping lupus.]

Einhorn and Heinz⁴ have discovered a local anesthetic which they have named **orthoform**. It is a white, crystalline powder, which is very slightly soluble in water. It dissolves just actively enough to cause a protracted influence when placed upon a wound. This anesthetic action can be observed on mucous membrane, granulations, or a wound. Used in powder or ointment, it is very valuable for burns of the third degree or painful ulcers. It is entirely nontoxic. It lessens the amount of secretion, prevents putrefactive changes, and stimulates the healing processes in the wound. It is of great value, for instance, in a painful ulcer of the larynx. It can be given with great benefit in cancer of the stomach; but in cases of chronic gastric catarrh or dilatation little benefit is to be expected from its use. The muriate of orthoform is freely soluble, and may be used internally; but is not adapted to subcutaneous injection because of the intense pain which it causes. From 5 to 15 gr. of orthoform may be given daily. If the salve is used for local application, 10% is the proper strength. As the drug is nonpoisonous, it may be dusted on surfaces freely.

DISEASES OF THE ESOPHAGUS AND STOMACH.

H. T. Butlin⁵ records a second case of **removal of a pressure-pouch** of the esophagus. The author has seen 6 such cases in his practice, and has operated upon 2 of them. He thinks that the condition is much more common than is usually supposed. He tells us that a genuine pressure-pouch is invariably situated at the junction of the pharynx and esophagus posteriorly, and that the opening into the esophagus is longitudinal, is in the middle line, and is about 1 in. long. The condition is more common in males than in females. Each of the author's cases was a man, and in all the symptoms were first observed after 40 years of age. There is 1 constant symptom—many hours after food has been eaten undigested fragments of it return, being coughed or hawked up. In some cases patients change their position at night and cough up fluid which was taken hours before. Pressure on the side of the neck in the posterior triangle will force portions of solid food and also liquids into the mouth. The esophageal bougie is arrested at a distance of

¹ Centralbl. f. Chir., No. 51, 1897.

² Ibid., vii., 1898.

³ Münch. med. Woch., Oct. 19, 1897.

⁴ Therap. Monatsh., Oct., 1897.

⁵ Brit. Med. Jour., Jan. 1, 1898.

about 9 in. from the teeth, for it generally passes into the pouch, and when it has passed into the pouch it can be felt and seen projecting to the side of the neck, usually to the left side, back of the sternomastoid muscle. Wasting and loss of weight are rarely observed until the disease is far advanced. The progress in these cases is very slow. In all reported cases in which operation was done the relief was permanent. [The term "pressure-pouch" does not signify that the esophagus has been subjected to great and unnatural pressure at one particular point, but rather that some part of the esophageal wall is in a weakened state, which causes it to yield and bulge under the influence of a natural amount of deglutitional pressure. There can be no doubt that the proper treatment is excision.]

Snyder¹ records a case in which **esophagotomy for the removal of a dental plate** was performed. The patient was a woman of 22. She was seen the day after the accident. Her voice was much impaired and she suffered from pain above the left sternoclavicular articulation. A flexible bullet-probe detected an obstruction 5½ in. from the incisor teeth. On the third day after the accident an operation was performed. A 2-in. incision was made along the inner edge of the sternomastoid muscle, the skin having first been drawn a little toward the median line, in order to form a valve-like opening. A long probe was carried from the mouth into the esophagus to locate this tube, and the esophagus was then incised and the finger inserted. The plate was readily detected and removed, and the patient made a satisfactory recovery. In this case the X-rays failed to locate the foreign body. [The necessity for making a valve-like opening is not apparent, and we are not convinced that such a procedure has any advantages.]

H. Zechhuisen² makes a report on 2 cases of **stricture of the esophagus** following the swallowing of lye. A number of physicians and surgeons who had seen these cases were of the opinion that they could not be treated with success. Zechhuisen followed the method of König. He had some silver balls made, the diameters of which ranged from 2 to 7 mm. A silk thread was passed through a hole in each ball, and the smallest ball was swallowed at night as far it would go, the thread being fastened above. The next morning the ball was found to have passed into the stomach, and was withdrawn. Each night a larger ball was swallowed, and in each case it passed into the stomach during the night. After a time the patient improved so much that a large-sized tube could be readily carried into the stomach. Christian Fenger³ reports a case in which he cured a stricture of the cervical portion of the esophagus by esophagotomy. The patient had been a sufferer for 5 years. At this period of time she had experienced difficulty in swallowing, and had been a sufferer off and on ever since, for the past 3 years having suffered continuously. When seen by Fenger she was able to swallow bread, if it was not very fresh nor too stale, and could also swallow finely mashed vegetables. She was not emaciated and had no cachexia. Palpation detected nothing; inspection of the mouth detected nothing. A large elastic bougie with a blunt end was arrested 14 cm. below the upper incisors; a fine elastic bougie could be passed 3½ cm. lower. In discussing the diagnosis, Fenger says that the history would lead one to think of a polypus in the neighborhood of the cricoid cartilage, causing difficulty in swallowing and attacks of suffocation by displacement, these attacks disappearing when the polypus resumed its ordinary position; but the inability to pass a sound was against the existence of a polypus, although the sound might be arrested in a pocket of the esophagus. In

¹ N. Y. Med. Jour., Sept. 18, 1897.

² Centralbl. f. innere Med., Jan. 15, 1898.

³ Med. Age, Mar. 24, 1898.

addition, one might be dealing with a stricture; but as almost all innocent strictures are caused by swallowing caustic fluid, and as malignant stricture is cancer, and as both of these etiologic factors were absent, the probabilities

plan of operation was, first, la, by making an incision in the trachea and insert a cannula, suddenly close the larynx for removal of tumor and to be irreparable, an incision was made along the lower free end of the esophagus and carried down into the stomach. The incision was made along the esophagian line. The isthmus of the stomach was cauterized with the Paquelin cautery between the wound packed with gauze. The incision was made along the lower free end of the esophagus and separation by the cautery were the next steps. The next retractors. The sternal incision of the large size of the wound and the superior and inferior incision being tied between the incision taken not to include the esophageal gland the esophagus was examined was unable to pass; no hardness or externally felt from the mouth a point which the instrument would pass by two loops of silk passed between the loops. The esophagus was found open and passed into the stomach. A membranous diaphragm. The incision, from left to right; it not be passed through it above the stricture against the, and through this opening. Between the 2 inch-thickness. This diaphragm between the upper and lower borders of the upper end was united. A flexible esophageal tube was inserted into the esophagus for 6 in. or more and united over the tube by a series of many muscularis-sutures.

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THE WOUND OVER THE TRACHEA WAS KEPT OPEN WITH A SEPARATE PACKING, TO MAKE tracheotomy possible if edema of the glottis should occur later on. The patient was subsequently fed through an esophageal tube. The wound in the esophagus failed to heal by first intention, and after the first 3 or 4 weeks cough would force out mucus through the wound. There was no infection and no fever. Six weeks after operation hoarseness was slight, the wound was a mere fistula, mucus was no longer forced up by coughing, and the

esophageal tube was removed. Three days later the patient was able to swallow liquid food, and nothing passed through the granulating tract. An elastic bougie 10 mm. in diameter could be passed easily without pain, but one 13 mm. in diameter caught at the place of stricture. At this period she began to take solid food. Two years after the operation the patient was perfectly well.

Christian Fenger¹ records an interesting case in which there occurred a fatal **acute dilatation of the stomach** after the operation of cholecystotomy. Cholecystotomy was performed because of obliteration of the cystic duct and suppuration of the gall-bladder. A small stone was found in the wall of the cystic duct and 3 small concretions were removed from the gall-bladder. The fifth day after operation the patient began to complain of pain in the abdomen, about 2 in. to the left and 1 or 2 in. below the umbilicus. The pain increased in intensity, and the vomita was found to consist of greenish fluid. There were constant nausea and occasional hiccough. The pulse was 120 and the temperature 100.2° F. In the evening the dressings were reopened. At the site of pain Fenger thought he detected resistance; there was not general tympany, but in the left epigastric region and extending 2 in. below the umbilicus a soft, "cushion-like" protuberance was felt and seen. The lower third of the abdomen above the symphysis was concave. The next day the vomiting continued; the pulse was 115 and temperature 99° F. Fenger first considered the possibility of a sponge having been left in the peritoneal cavity. The second day he considered acute dilatation of the stomach. The diagnosis of acute dilatation of the stomach seemed certain, as the tympany and pain disappeared and the vomiting ceased after the use of the stomach-tube. The question considered was, Is the dilatation due, first, to edema and paralysis of the stomach-wall; second, to bending or kinking of the pylorus from an over-filled, heavy stomach, or to stenosis of the duodenum from gauze-packing, pulling up of the gall-bladder, or formation of bands of adhesions? During the next 2 days the patient grew worse, and on the tenth day after operation died. The autopsy was made 3 hours after death. The abdomen was opened, and there was found to be no fluid and no adhesions and no fibrinous matter, but the stomach was enormously enlarged and presented the appearance of a fat arm in flexion, the arm being formed by the fundus and descending cardiac portion of the stomach, and the forearm being formed by the pyloric portion. The descending and ascending arms were in contact. The surface of this sac was smooth and grayish-white—not bluish. The color was somewhat paler than normal. Cultures were taken on blood-serum, agar, and glycerin and agar. In a portion of the omentum a swelling was felt the size of a hen's egg, which was composed of dark blood. The bleeding had been from a stitch through a branch of the superior epigastric artery. Fibrinous adhesions between the stomach and gall-bladder were loosened, and the fundus of the gall-bladder, with its opening, was found adherent all around, and walled off from the peritoneal cavity. The autopsy therefore showed that there was no peritonitis, that no sponge had been left behind, and that the peritoneal cavity was safely walled off from the field of operation, the gall-bladder and tract of the drain, down to the cystic duct. Besides the enormous dilatation of the stomach and the upper portion of the duodenum there was contraction of the small intestine and ascending transverse and descending colon, with dilatation of the sigmoid flexure and rectum. Fenger then reviews the various reported cases of this interesting condition.

Gastrectomy.—Schlatter² reported a case in which he extirpated the

¹ Clinical Rev., Feb., 1898.

² Correspondenzbl. f. Schw. Aerzte, Dec. 1, 1897.

entire stomach and joined the esophagus to the intestine. The patient was a woman, 56 years of age. She had a distinctly palpable tumor of the stomach, which was evidently malignant. Exploratory incision disclosed a tumor extending from the pylorus to the cardiac end of the stomach. The tumor was mobile, and there were some small glands at the pyloric end. The entire stomach was invaded, and hence the operation of gastroenterostomy could not be performed. Schlatter determined to remove the entire stomach. The stomach was drawn downward, the esophagus was grasped with ordinary compression-forceps, and the esophageal end of the stomach was caught with forceps and the tube was cut across. The esophagus was reached by opening through the greater and lesser omentum with Péan's forceps and ligating with silk. The resection at the pyloric end of the stomach was accomplished in a similar manner. The enlarged lymphatic glands were removed. It was found impossible to join the duodenum and esophagus, so the end of the duodenum was inverted and sutured. The third portion of the duodenum was found, and was joined to the esophagus by an anastomosis, a series of interrupted silk sutures being used in the mucous membranes and Lembert sutures being employed in the serous coat. The abdominal wound was sutured and dressings applied. A careful examination of the tissue removed made subsequently showed that the entire stomach had been taken out, for there were portions of the esophagus and duodenum with the mass removed. The patient was fed after the operation by nutritive enemata, which were continued for a considerable time. In the evening some tea and milk were given by the mouth, and produced no disturbance. The second day after the operation the enemata were rejected, and there was considerable pain in the epigastric region. The third day milk, eggs, soup, and wine, mixed with pepsin and dilute muriatic acid, were given every 2 hours by the mouth. On the seventh day the dressings were removed, when the wound was found to have healed by first intention. The first stool was on the fourth day after the operation. Occasionally some of the swallowed milk was regurgitated, and 10 days after the operation the patient vomited. Twenty days after the operation the patient took for dinner half a chicken; in the evening she took milk and egg, and an hour afterward vomited, with great contraction of the abdominal muscles and considerable choking. The vomited matter contained milk and some of the egg and some portions of flesh, and after the vomiting the patient had a bitter, bile-like taste in her mouth. She vomited on several subsequent occasions. Chemical examinations of the vomited mass showed the absence of free hydrochloric acid and the presence of lactic acid. Gallic acid and bile-pigment were also found. At this period the administration of pepsin and hydrochloric acid was discontinued. In the first 2 months after the operation the patient gained about 4400 gm. in weight. This case shows that some of our views about the importance of the stomach in digestion are erroneous. In the chronic diseases, such as this patient labored under, the capacity of the stomach had been gradually and progressively modified, and its secretions had been altered and the system had grown somewhat accustomed to doing without a stomach before the organ had been removed. The author has determined from this case that the chief function of the stomach is as a food-reservoir, the food being retained here for a time which depends upon its digestibility, the retention preventing overloading of the intestines and the temperature of the food being lowered or raised to a degree which is not harmful. Schlatter first administered with the food pepsin and hydrochloric acid. Pepsin is of no avail in the alkaline juices of the intestine, and he found that the hydrochloric acid was neutralized, and so discontinued both agents. He found that the action of the stomach on bacteria

was very slight, and that absorption from the stomach is small in amount. It did not seem that the food was accelerated in its passage through the alimentary canal, and there was no pronounced change in the chemical analysis of the urine. The author studied the act of vomiting, and finds that it is a complicated act, with a great number of movements of the muscles of the stomach and esophagus, the muscles of deglutition, the diaphragm, and the abdominal muscles, these movements arising from a central influence, and these vomiting-centers being capable of stimulation by a great variety of reflex irritations. The gain in weight which this patient has shown for so long a time after the operation exhibits the fact that the chief function of the stomach is as an organ to protect the intestines, and that the intestines are entirely capable of doing the chemical work usually performed by the stomach. [There have been several successful gastrectomies reported. Schlatter's case, 1 by Bingham, of San Francisco, and 1 by Maurice Richardson, of Boston. Even before Schlatter's operation very large portions of the stomach had been removed. Langenbuch removed seven-eighths of the stomach. Schuchardt removed the entire stomach excepting a very small portion near the cardiac end. Krönlein, Maydl, and von Hacker each removed almost the entire stomach. These operations of almost complete removal are practically identical in physiologic results and surgical dangers with total gastrectomy. Total gastrectomy will never be a usual operation. A surgeon of limited experience in abdominal work should not attempt it. Occasionally it should be performed. The cases suitable for this operation are those in which the entire stomach, or almost the entire stomach, is diseased, the parts about not being infiltrated, and any enlarged glands being capable of removal.]

J. M. Baldy¹ records a case in which the stomach was removed for sarcoma. The tumor for which the operation was performed filled the whole abdomen from the pubis to the ensiform cartilage. The growth was evidently malignant, and was supposed to be a growth of the mesenteric glands or the omentum. An incision was made from near the ensiform cartilage to near the pubis. The abdominal wound was retracted, and a large amount of hemorrhage took place from the vessels of the omentum; the hemorrhage was so great that the operation had to be finished at all hazards. The tumor was lifted and found to be adherent to the intestines. These adhesions were readily separated; the tumor was freed in all directions, leaving the mesentery infiltrated with masses of malignant growth. It was seen that the case was hopeless. The separation was continued up to a point which was afterward found to be the attachments of the stomach. What was thought to be the healthy stomach was found high up, and in front closely attached to the tumor, apparently in much the same way as the intestines had been. The belief of all present was that the sarcoma arose from behind the stomach. An attempt was made to separate the apparent stomach and the tumor at their point of adhesion, but was soon desisted from. It was determined to break into the tumor several inches below its junction with the stomach, leaving part of it attached to that organ, remove the rest, and thus gain room enough to close the abdomen and finish the operation. A point was fixed upon, the finger was forced into the mass, and after proceeding to the depth of several inches the finger entered a cavity, and in a moment the situation flashed upon the surgeon. A careful examination made suspicion a certainty—the tumor was the stomach, and the healthy part was the small anterior portion presenting at the upper angle of the wound, and this had been mistaken for the lower part of the entire organ. This portion proved to be a part of the anterior surface

¹ Jour. Am. Med. Assoc., Mar. 5, 1898.

of the cardiac end. Baldy accepted the inevitable, removed all the large mass, ligated the bleeding-points, attempted to form the pretence of a stomach from the small piece remaining of the cardiac end, esophagus, and gut, and closed the wound. The patient lived about 36 hours. Baldy had no doubt whatever at the time, and has none now, that had there been sufficient healthy tissue at the esophagus to allow of a firm attachment of the gut to that canal the result would have been different.

Hugo Summa and A. C. Bernays¹ report a case of carcinoma of the stomach, for which excision of the entire viscus was performed. The first step in the operation was transverse section of the pyloric extremity of the stomach, 1 in. from the duodenum. The 2 openings made by the cut were clamped. The duodenal end was drawn out of the wound and placed upon the right side of the abdomen, out of the way. A plug of gauze was inserted into the pyloric stump to prevent escape of intestinal contents. The posterior wall of the stomach was then freed from adhesions and the pancreas, and the stomach was cut off from its omental connections along the greater curvature to the fundus. The separation of the minor curvature from the crura of the diaphragm, the aorta, and the structures in front of the vertebral column was difficult. The minor curvature was freed up to the esophagus. After the entire stomach was freed from its connections, the esophagus was caught with a pair of forceps and cut across $\frac{1}{4}$ in. above the cardiac end. It left a small strip of stomach attached to the esophagus as a handle; but it proved to be too weak, and was soon afterward cut away. The pyloric stump was freely movable, and was easily drawn upward, but the esophagus was almost unmanageable because of its elasticity and its tendency to slip through the foramen ovale of the diaphragm. Bernays adopted a method of making direct union between the stump of the pylorus and the esophagus, which seemed easier than the plan employed by Schlatter. There was a difference in size between the lumina of the esophagus and the pyloric stump, but the esophagus just above the cardia was very lax and dilatable. Three fingers could readily be introduced without stretching it perceptibly. He made the stitches in the pyloric stump a little further apart than in the esophagus, the stitches including all the layers except the mucous. The posterior walls were united first by a series of stitches, which were tied upon the mucous side. Next, 3 stitches were inserted on the lateral aspects; the knots were tied upon the outer surface. Lastly, the anterior portions of the pylorus and of the esophagus were sutured. The space left by the removal of the stomach was filled to a great extent by the transverse colon, the splenic flexure, and the coils of the jejunum, but it was necessary to fill up some of it by a gauze packing. The operation required 2 hours and 6 minutes. At the conclusion of the operation the patient was in fair condition. Nutrient enemata were administered, and for the first 22 hours the patient remained in fair condition. During the day, however, he grew weaker, and died 31½ hours after operation. A post-mortem was not permitted, but the abdominal wound was opened sufficiently to determine the fact that there was no peritonitis. Bernays says that in future operations he will use a rubber tube attached to a silk cord long enough to be passed up through the esophagus and out of the mouth. He will leave this tube in the duodenum, extending from about the beginning of the jejunum to near the opening of the larynx. By pulling it into the pharynx nutrient predigested fluids can be injected at regular intervals. In order to facilitate suturing between the esophagus above and the other section below, whether that other portion be the pylorus, the duodenum, or the jejunum, Bernays suggests making the union

¹ Jour. Am. Med. Assoc., Feb. 12, 1898.

before the stomach is completely cut off from the esophagus, because if this is done the esophagus can be pulled down and made accessible. Nearly all the sutures can be passed before the esophagus is cut off. [Another fatal case has recently been placed on record by W. H. Noble, in the *N. Y. Med. Jour.*, July 23, 1898.]

A. H. Meisenbach¹ writes on **gastrotomy for the removal of foreign bodies** from the stomach, and reports a case. He tells us that gastrotomy was performed as long ago as 1602, but from this period to 1887 only 35 cases have been recorded. From 1887 to the present time 22 cases have been reported. Gastrotomy, even before the days of anastomosis, was a comparatively safe procedure, for of the 35 cases operated on previous to 1887 only 5 were fatal. The patients upon whom this operation was performed were either lunatics or fakirs, who swallowed the objects for money. The indications for operation are: first, the presence of a body that, on account of its size or form, cannot pass through the intestines; second, the presence of urgent symptoms in the patient. Foreign bodies may be retained in the stomach without serious symptoms for a very long period of time; in fact, in lunatics their presence may not be known during life. The symptoms which result depend largely upon the form, size, number, and weight of the bodies. Long bodies, such as knives, forks, spoons, pencils, and bars of metal, are likely to remain in the stomach and to give rise to positive symptoms because of their weight and form. When numerous small objects are swallowed their accumulation will eventually, by their weight, cause serious symptoms, producing dilatation of the stomach, inflammation, adhesions, or perforation. The long-continued presence of foreign bodies in the stomach, although tolerated fairly well, eventually causes disturbances of the nutrition and other local troubles, catarrhal conditions of the stomach, and pains in the stomach which shift from one spot to another, and which are often influenced by the position of the patient. When foreign bodies set up symptoms these symptoms are likely to become more pronounced. The patient grows pale; there may be vomiting, hemorrhage, wasting; and eventually death may ensue. If a foreign body is in the stomach, the sooner it is removed the better will be the prognosis, it matters not what the character of the body may be. Meisenbach's patient termed himself the "human ostrich;" he followed the profession of swallowing glass, metal, etc., for 9 years. He was 22 years of age. While still at school he had gone to an exhibition by a professional glass-eater, and had paid this artist \$10 to teach him how to eat glass. He found that he could perform the feat readily, and began to give private exhibitions. He took an interest in swallowing other objects, such as nails, and also practised sword-swallowing, and in 1894 joined a company; since then he had been continually giving exhibitions at least once or twice a week. In the early part of March, 1897, he started on a trip, and gave from 6 to 12 exhibitions daily, swallowing a bite or two of glass, 4 or 5 nails, screws or cartridges, or a few fence-staples. He always carried a supply of such objects, so as to be able to give an exhibition at any time. In his repertoire were pearl-top lamp-chimneys, 2-, 4-, 6-, and 8-penny wire fence-nails, barbed-wire fence-staples, and 32- and 38-caliber cartridges. He never swallowed tacks. Up to 1897 he had no trouble. On March 16 he noticed pains and a lump in the stomach, and on the 18th he swallowed a 32-caliber cartridge. He came to St. Louis to seek relief, when he complained of a weight in his stomach, but had no other pains. Palpation and percussion with the patient standing upright, the body inclined forward, the mouth open, and the abdominal muscles relaxed, revealed a mass in the

¹ Jour. Am. Med. Assoc., Mar. 5, 1898.

umbilical and hypogastric regions, which could be raised, and in descent a distinct impulse was detected against the fingers. Palpation and percussion with the patient supine revealed a mass in the umbilical region. When he changed his position the mass shifted; the manipulations caused no pain, but when deep pressure was employed it hurt him. Preceding operation the patient was placed on liquid diet. Meisenbach was persuaded that the foreign bodies were in the stomach, because the position of the mass was constant and was in the gastric region. The previous history of the patient also pointed to this conclusion. On April 5 the stomach was inflated with air to outline its lower border, and it was found below the umbilicus. It was decided to employ the X-rays. The plate was not satisfactory; the lumbar spine and the lower part of the thorax were faintly shown, and there was a shadow marking the position of the tumor, which, though it was not very clear to the practised eye, demonstrated the presence of a foreign body. This shadow was a little to the right of the spinal column and in the umbilical region. A further exposure to the X-rays was made the evening before the operation, but the development of these plates showed that the first plates were the best. On April 7 the operation of gastrotomy was performed, the stomach having been washed out with a Pasteurian solution half an hour previous to the operation. The incision was in the median line. When the hand was introduced into the abdominal cavity the mass could be felt nearer to the pyloric end of the stomach. The viscus was drawn out of the abdominal wound to such an extent as to bring the mass into the bottom of the wound-area. Sterilized gauze was packed around the stomach and the organ opened, the incision being 2 in. in length. A large number of foreign bodies were removed by means of Bergmann's calculus-forceps. It was decided after using this instrument for a time that there was some danger of injuring the walls of the stomach, so the opening was enlarged by $2\frac{1}{2}$ in., making it $4\frac{1}{2}$ in., and the operator's hand was passed into the cavity of the stomach. The foreign bodies were removed. The stomach-wound was closed by 3 rows of sutures. The first suture was strong No. 6 silk, passed through the mucosa as a continuous stitch, threaded on a straight, thick darning-needle. The second was of the same size silk, and was passed so as to bring the peritoneal surfaces in apposition. The third row was made with No. 2 braided silk threaded on a straight No. 8 sewing-needle, and completely buried the previous sutures by a continuous Lembert suture. The stomach was wiped off with gauze, as was the abdominal wound. The gauze packing surrounding the stomach was removed and the stomach dropped back into the abdomen. The time of the operation was 1 hour. This patient made a complete recovery. The list of articles removed is extraordinary: 25 staples for barbed-fence wire, 15 $1\frac{1}{2}$ -in. screws, 6 2-in. horseshoe nails, 16 2-in. wire nails, 30 $1\frac{1}{2}$ -in. wire nails, 16 32-caliber cartridges, 5 38-caliber cartridges, 2 pocket-knife blades, which were broken, 2 in. of brass watch-chain, and 2 small staples. The total was 119 pieces; 8 cartridges passed at stool after operation; there was also 1 oz. of comminuted glass, making the total number of objects 127, and the total weight 1 pound.

A. W. Mayo Robson¹ makes a plea for an **earlier performance of gastrotomy**. He says that this operation is usually viewed as such a formidable procedure that medical attendants are likely to oppose its performance, but death by starvation is such an appalling fate that the question should be raised whether the past opinions held are not erroneous, and whether surgery does not hold out some prospect to these unfortunate cases. Why has the

¹ Practitioner, Sept., 1897.

operation of gastrostomy obtained such ill repute? The first reason is because it is not even yet a rule to operate early, the custom being to defer it until the sufferer is so feeble as to be unable to withstand the shock of the operation. Even if he reacts from shock, his healing-powers are greatly impaired, and there is likely to be failure of union and death from wound-complications, or his powers of assimilation are greatly weakened, and death may ensue at an early period from exhaustion. Another reason why the operation has not become popular is because the fistula is likely to permit of leakage of food and irritative gastric secretion, the abdomen being excoriated and the life of the patient rendered uncomfortable. Robson maintains that if the operation is performed sufficiently early, and if it is performed according to the proper method, it will be found one of the most useful and beneficent operations of surgery. The operation he usually performs occupies but a few minutes, and is a modification of the Ssabanejew's-Frank method. A vertical incision $1\frac{1}{2}$ in. in length is made through the outer third of the left rectus muscle, commencing $\frac{3}{4}$ in. below the costal margin. The fibers of the muscle are separated by blunt dissection to the extent of the incision, and the posterior part of the rectus sheath and peritoneum are divided together, the opening being 1 in. in length. A portion of the cardiac end of the stomach is brought up through the wound, and 4 sutures are inserted into the base of the cone to fix the visceral peritoneum of the stomach and the edges of the parietal peritoneum. A transverse incision $\frac{1}{2}$ in. in length is made through the skin 1 in. above the upper end of the first cut, and by means of a blunt dissector the subcutaneous tissue is undermined; the 2 openings join beneath a bridge of skin and subcutaneous tissue. A pair of forceps is pushed through the upper incision down to the projecting portion of the stomach. The viscus is grasped at its most prominent part and drawn up out of the second opening, where it is retained by 2 harelip-pins. It requires no sutures. The lower opening is closed by 2 silkworm-gut sutures. If needful, the stomach can be opened at once by a tenotomy-knife introduced between the pins; but, if possible, the opening should be deferred 24 hours, when a barrier of lymph will have been thrown out. After opening, a No. 8 soft catheter is inserted, to which a piece of tubing is fixed, and by means of a funnel the patient can at once be fed with warm milk and eggs. The catheter may be left in place for a few days, after which it is inserted whenever a meal is required. In the performance of the operation of gastrostomy, if the patient is much exhausted, a general anesthetic may be dispensed with and cocain employed, as the only pain is due to the skin-incision. There is little or no shock in this operation. When the operation is not put off until too late, death should not occur except from an accidental complication. After the performance of gastrostomy for malignant stricture of the esophagus, Robson has seen the patient gain 20 pounds in weight. [We are in hearty accord with Robson that the operation should be performed earlier than is usually advised. The proper period is that set by Mikulicz, when the patient begins to lose weight steadily and when there is beginning difficulty in swallowing semisolids or liquids.]

C. A. Ewald makes a report¹ on **68 operations for malignant disease of the stomach**. His mortality was between 54 and 69%. The operation of gastrostomy must be performed for humane reasons, although it is simply a sort of euthanasia. He states that the prognosis of these operations must be doubtful, even in the most apparently favorable cases; but surgical intervention should be suggested in every case in which it is indicated, and when it is determined on the operation should be performed without delay.

¹ Therap. Gaz., Nov. 15, 1897.

The presence of lactic acid is no longer considered important in making a diagnosis of cancer of the stomach. At the time lactic acid is first present the tumor will be recognizable by palpation. [M. Doyen¹ considers the results of 146 operations upon the stomach. Sixty-six of these cases were malignant disease. Out of the entire 146 cases, only 22 died, and in 20 of these cases malignant disease existed. Hence it appears that operations, when there is not malignant disease, are not very dangerous. He prefers Roux's method of gastroenterostomy.]

A. Heydenreich² writes on **surgical intervention in ulcer of the stomach**. He states that without surgical intervention the mortality of such a condition is from 15% to 50%. Gerhart estimates it at 28%. In those cases which have been treated by resection of the pylorus, the mortality is 27.8%; in cases treated by gastroenterostomy, 16.2%; in cases treated by pyloroplasty, 13.2%. Heydenreich states that the following conditions call for surgical interference: 1. Perforation. If perforation occurs, the abdomen should be opened, the peritoneal cavity thoroughly cleansed, and the perforation sutured. If this operation is not done, practically every patient will die. 2. Stricture of the pylorus as a result of ulcer. 3. Violent pain resulting from adhesions. 4. Profuse hemorrhage. 5. When even without the above-mentioned complications, the symptoms have not been mitigated by long-continued and careful medical treatment.

Braun³ makes a report of a case in which he closed a **perforation** in the stomach by sewing in omentum. The patient had suffered for a long time from ulcer of the stomach, and pyloric stenosis had resulted from the scars. Braun discovered that there had been recently a rupture, numerous fresh adhesions tying down the stomach, so that it was impossible to bring it up to the parietal peritoneum. The tissues were extremely soft and tore when sutures were introduced. The method he devised to meet the condition was as follows: He lifted up a fold of great omentum and sutured it over the opening, performed gastroenterostomy, washed out the peritoneal cavity, and closed the abdomen. The patient made a perfect recovery.

J. S. McArdle,⁴ in a paper on the **surgery of the stomach**, calls attention to the more **important aids** that we possess for the detection of affections likely to be benefited by operation. The most generally useful apparatus is the tube with a funnel attached, which is known as Kussmaul's tube. By means of this tube we can obtain evidence of the character of the contents of the stomach, and by washing out we can obtain a notion of the capacity of the stomach. The extent of the dulness may be traced on the wall of the abdomen and an idea be obtained of the position of the pylorus. While the stomach is distended with fluid an intermittent rush through the pyloric orifice can be heard if the phonendoscope is applied to the abdominal wall. This indicates that the valve is acting properly, while a continuous sound of passing fluid would be evidence of induration of the pyloric end of the stomach without distention. The absence of all sound and the permanent distention, shown by persisting dulness, indicate pyloric obstruction, usually organic in character. The apparatus for the electric illumination of the stomach is of less value than is Kussmaul's tube. The patient must be examined in a dark room and the fluid contents of the stomach must be removed by washing. When the stomach has been washed out boric acid or gas is introduced through the tube, in order to dilate the stomach. This dilatation is necessary in order to prevent the heated bulb touching the mucous membrane. By observing

¹ Report to French Academy of Medicine, Feb. 8, 1898. ² Sem. méd., Feb. 2, 1898.

³ Centralbl. f. Chir., No. 27, 1897.

⁴ Dublin Jour. Med. Sci., Feb. 1, 1898.

the abdominal wall, an idea may be obtained of the extent and position of the organ, and thickening to any degree on the anterior aspect may be made out. The hydrogen-balloon is an instrument of great value in the diagnosis of pyloric trouble. It is a rubber balloon capable of exerting a pressure of 4 pounds to the square inch. This is filled with hydrogen gas. After washing out the stomach with Kussmaul's tube, the nozzle is passed into the funnel and the gas allowed to slowly enter the stomach. When the epigastrium is visibly distended the phonendoscope is placed over the normal position of the pylorus. When the valve is acting an intermittent whistling-sound is heard and variations of epigastric tension are noted. A continuous sound indicates that the closure of the pylorus is retarded through induration or bands of adhesions; but the absence of any whistling and the continuance of gastric distention show that closure of the pylorus is present. When the stomach is distended with this light gas there is a marked tympanitic note and the outlines of the organ can be accurately determined. This apparatus is of great value in examining the intestines for tumor, stricture, or perforation, Lund's insufflator being inserted into the rectum. The air-pad prevents the escape of gas during the insufflation. The same apparatus is useful in finding the bowel in lumbar and abdominal colotomy. When hydrogen is used to detect a perforation of the stomach or intestine, an aspirating-needle is passed through the linea alba into the peritoneal cavity. If any gas escapes a light is applied, and if there be a perforation this light will burn as does hydrogen gas. It is very dangerous to inject fluid or air into an inflamed or thinned bowel, since it is impossible to determine the pressure we are exerting, and rupture may occur. It is dangerous for this reason to inject with a Higginson syringe. A pressure of 2 to 4 pounds is sufficient, and with the apparatus above outlined this pressure can be certainly obtained. We should not employ any crude method. Gaseous dilatation has certain great advantages: 1. The sounds of the passing gas are much more distinct than are the sounds of passing fluid. 2. It is easier to map out definitely distended organs. 3. The gas passes so quickly that it requires but a brief time to make an examination. 4. The position of solid masses in front of or bearing on distended viscera can be distinctly made out. The author reports cases to illustrate the value of these methods.

Tuffier¹ writes on **gastroenterostomy**, and maintains that the operation is of great value in noncancerous pyloric stenosis. In 8 cases, 7 did admirably, and 1 died from intestinal hemorrhage 8 days after operation. Tuffier prefers posterior gastroenterostomy, if there is no great difficulty in reaching the posterior wall of the stomach. The opening is made large and the jejunum is attached to the most dependent portion of the stomach. The indications for the operation are evidences of stenosis with gastric dilatation. Ectasia without stenosis is not much improved. It is important to make an early diagnosis of the nature of the stenosis, because if it be due to malignant disease the more radical operation is indicated. In the 7 cases of cure recorded by Tuffier the patients became entirely well and remained so.

Arthur E. Barker² discusses the operation of gastroenterostomy for cancer of the pylorus. He refers to the last 4 operations which he has performed, and states that every one of these patients was operated on at too late a period. Two of them died, one from shock and another from inanition, which was made worse by shock. In the two that recovered the new opening was perfectly satisfactory. In one of these cases the stomach had been dilated for a long period of time and contained ulcers, and one of these ulcers subsequently eroded an artery,

¹ *Gaz. hebdom. de Méd. et de Chir.*, Dec. 5, 1897.

² *Brit. Med. Jour.*, Feb. 12, 1898.

producing fatal hemorrhage. In the other case the symptoms were greatly relieved after the operation; but the cancer progressed and eventually opened into the peritoneum, causing death. In one of his cases he used Senn's bone-plates and in another Murphy's button. He prefers, however, simple suture with silk to any mechanical device. He calls attention to the fact that in two of his cases hydrochloric acid was absent in the stomach-contents. He does not think that the operation is of very great value in malignant disease; but if done early, it may give the patient comfort.

W. W. Keen,¹ in the Cartwright Lectures for 1898, before the College of Physicians and Surgeons of New York, reviewed the **surgery of the stomach**, and set forth the history of the surgery of the stomach from 1875, before which period it really did not exist. In discussing the operation of **gastrolisis**, or loosening the stomach from adhesions, he says that the procedure has a restricted but important field. Adhesions are usually produced by ulcer, but may be caused by gall-stones, peritonitis, etc., and they may fasten the stomach to neighboring viscera. Adhesions produce colic and other painful conditions, and may give rise to constriction or volvulus of the bowel. Posterior adhesions cause little trouble, because the posterior organs are not mobile; but adhesions to mobile organs, and especially anterior adhesions, cause severe pain and chronic digestive disorders. It is difficult to make a diagnosis of this condition, but occasionally we can do so, and in some reported cases it has been definitely diagnosed before operation. The adhesions vary much in character. They may cover a large area or may be limited. Lauenstein operated on 10 cases by excision of the bands or loosening the adhesions; 9 of these cases recovered and 1 died. Robson reported 2 successful cases, in which the dilatation of the stomach completely passed away. Broad adhesions are much more serious than band-like adhesions. In very extensive adhesions the operation of gastrolisis will not cure, and it is necessary to perform resection or partial gastrectomy or a gastropasty. Three indications exist for the performance of **gastrotomy**: First, the removal of foreign bodies. The method of making diagnosis of foreign bodies is of interest. In one case hydrochloric acid was given to the patient, the stomach was washed out, and the fluid tested with potassium ferrocyanid. In a patient who had swallowed a metal fork the diagnosis was made by the use of an electromagnet, and in another similar case by an electric sound. Meisenbach reported the first case in which the diagnosis was made by the use of the X-rays. Foreign bodies have been removed not only from the stomach, but in several cases by gastrotomy from the esophagus, as in the case of Richardson, who removed an artificial denture which had been in the gastric end of the esophagus for 11 months. The second reason for performing gastrotomy is in order to carry out a retrograde dilatation for esophageal stricture. In 1894 Frank collected 21 cases of gastrotomy for retrograde dilatation or division for nonmalignant esophageal stricture, and since then a few additional cases have been reported. The operation was first performed by Loreta in 1883. In Frank's table the result is known in 21 cases, and 20 of these recovered. Dilatation can be performed by two methods: 1. By immediate dilatation and division, the stomach and abdomen being immediately closed. 2. A temporary gastric fistula is made, and when the dilatation has been accomplished the fistula is allowed to close, or is closed by a plastic operation. Some ingenious modifications of the operation have been carried out. Hagenbach made a gastric fistula and had the patient swallow a perforated shot which was attached to a string. The shot was seized through the fistula, strong thread was drawn up through the

¹ Phila. Med. Jour., May 7, 1898.

esophagus, and the stricture was then dilated through bougies. Lange in this manner tried by knife-blades to do **internal esophagotomy**. In 1893 Abbe proposed the string-saw method. In this method a string is passed through the gastric fistula and is brought out through the mouth, or, better, through an opening into the cervical portion of the esophagus. The stricture is put on the stretch by a bougie and the string is sawed to and fro. It divides the tense stricture, but not the relaxed portion of the esophagus. Frank dilated a stricture of the esophagus by Otis's urethrotome, the cutting-blade having been removed. A tube was passed and then a string, to which was attached a plug of gauze, which was removed the same evening. Of course, it is understood that in any case which can be treated by dilatation through the mouth gastrotony is not to be performed, but above the stricture the esophagus becomes much dilated, and it is often very difficult to discover a small opening by using a bougie from above. A bougie carried upward from the stomach through the esophagus will be much more successful in finding the opening. The third reason for opening the stomach is purely for exploration. Cases of this have been reported by Bradford and Treves. Keen is the more convinced of the innocuousness of this procedure, and that in future it will be of great service, and be more frequently employed, because of his experience in 2 cases, which he proceeds to set forth. In any case in which by ordinary means no positive diagnosis can be reached, we are thoroughly justified in making an exploratory gastrotony. He says the operation may be performed for non-malignant stricture of the esophagus; occasionally, also, for other equivalent conditions, such as a tumor outside of the esophagus. The most frequent indication for the operation is malignant disease of the esophagus or of the cardiac end of the stomach.

Sedillot did the first **gastrostomy** in 1849. Of the first 31 operations reported, 96.7 % died. In the remaining 132 operations there were 78 % of recoveries. A fair estimate of the present mortality of the cases of malignant disease is 25 %, and in cases of nonmalignant disease 10 %. The first operations were done by the method of Egebert and by the incision of Fenger, of Copenhagen, parallel with the border of the left ribs. The stomach was fastened to the abdominal wall, followed a few days later by a direct opening into the stomach. The opening was large, and leakage of the gastric contents inevitably took place, the skin around the opening becoming excoriated, and all mechanical devices to prevent this failed. Improvement has been notable in 2 directions: first, the operation is performed at an earlier period; and second, a type of operation has been adopted which prevents leakage. Willy Meyer has quoted Mikulicz as advising operation as soon as there is resistance to the passage of fluids or semifluids, or as soon as the patient shows a steady decrease in weight. In 1886 Hacker performed an operation in which he made a longitudinal incision in the left rectus muscle, 1 in. below the border of the ribs and to the left of the median line. He separated the muscular fibers by blunt dissection, drew a portion of the stomach out, and fastened it in the incision between the muscular fibers, these fibers being intended to act as a valve. Two or three days afterward he opened the stomach and introduced a tube, keeping this tube permanently in place in some cases, in others introducing it only at the time of feeding.

Girard, in order to increase the sphincter-like action of the rectus, crossed the muscular fibers, drawing the fibers of the right side toward the left and the fibers of the left side toward the right, and placing the stomach-tube between the crossed fibers. Ssabanejew and Frank hit upon an ideal new method. This method is as follows: An oblique incision is made along the

left border of the ribs, and the cone of stomach $1\frac{1}{2}$ in. in length is drawn out. A second incision is made and enlarged above the border of the ribs. The bridge of skin between the two incisions is undermined, the base of the stomach-cone is sutured to the first incision, the cone is drawn out through the second incision and secured by two or more sutures, and the abdominal incision is closed. The apex of the stomach is opened immediately. When food is to be given a tube is introduced, but the tube need not be worn constantly. Hahn's method is as follows: The abdomen is opened at the border of the ribs and a second incision is made from the eighth interspace. The stomach is drawn out through the intercostal space and fastened there. The method of Hahn does not absolutely prevent leakage, and in some cases necrosis of the cartilages of the ribs takes place. It is now practically abandoned. In 1891 Witzel devised a new method by which a long oblique canal was tunnelled in the stomach-wall. Andrews devised a method. In this the stomach is opened by a vertical incision for about 2 in., and through this incision a part of the anterior wall below the opening is drawn out. The mucous membrane alone is incised on each side by a cut parallel with the tube, and to such a distance that its proximal edges will encircle the tube, over which they are sutured. The distal edges are then brought over the tube, already covered with mucous membrane, and united by suture. Other methods alluded to are those of Stamm, the younger Senn, Kader, and Marwedel. Keen himself has employed the Ssabanejew-Frank and the Witzel methods, and of these two he greatly prefers the Ssabanejew-Frank method, as in it we are able to dispense with the permanent wearing of a tube. The author then discusses **gastroenterostomy**, and he tells us that the indications for its performance are malignant stricture of the pylorus, nonmalignant stricture, and ulcer of the stomach, and he thinks it probable that in future a fourth indication may be accepted—namely, obstinate digestive disorders which have not been cured by purely medical means. The most recent mortality-tables of the operation of gastroenterostomy are those of Carle and Fantine, and they show a mortality of 4%. In nonmalignant cases gastroenterostomy acts most favorably. The mortality is very low, the hyperacidity of the gastric juice disappears, and the normal function of the stomach usually returns permanently. Even in malignant cases life is prolonged in a few cases beyond 2 years; but even if the prolongation of life is brief, the patient is made infinitely more comfortable. It is not really a question of how long the patient lives, but how he lives. The operation of gastroenterostomy was first performed by Wöldfer, in 1881. The author then discusses the various methods which have been employed, both anterior and posterior, and he states that the ideal method has not as yet been found.

In considering the operation of **pylorectomy**, he states that practically the only lesion for which it is performed is cancer of the pylorus. The first pylorectomy was performed by Péan, in 1879, and the first successful pylorectomy by Billroth, in 1881. The mortality of the operation has been so great, as compared with gastroenterostomy, that it has lost favor with most surgeons; but Wöldfer insists that this conclusion must not be held to, stating that whereas the mortality with extensive adhesions is 72.7%, in cases without adhesions it is only 27.2%. The great obstacle to operation is the difficulty of making a sufficiently early diagnosis. Few surgeons have operated in the absence of a palpable tumor, and by the time a tumor is palpable it is usually too late to operate, even should there be no adhesions.

Keen agrees with Hemmeter in his estimate of the indications for operation when no tumor is palpable. These indications, according to Hemmeter, are: 1. When there is dilatation of the stomach; 2. When cachexia exists;

3. In the absence of hydrochloric acid; 4. When there is an excess of lactic acid; 5. When the Oppler bacillus is present. To these symptoms we may add, 6. The age, which is usually past 40; 7. When hematemesis is present, which it is no doubt in 40% of cases; 8. The examination of the blood may aid us, as the number of red corpuscles and hemoglobin are diminished, and the increase in white corpuscles which normally occurs after a full meal is absent in gastric cancer. Stenotic symptoms accompanied by these signs are indications for operation, even when no tumor is palpable. If on these grounds an exploratory celiotomy is done, we shall have a much better result from pylorotomy than heretofore. Whether a pylorotomy shall be done or not depends upon three factors: 1. The extent of the tumor; 2. The extent of the adhesions; and, 3. The extent of the involvement of the glands. To remove a pylorus and leave a number of infected glands is unsurgical, the patient running a high risk with no corresponding benefit. Mikulicz has shown that these glands are in 4 series, those of the lesser curvature, placed especially around the cardia and esophagus, those of the greater curvature, those between the stomach and the transverse colon, and those near the pancreas. For cases in which there is extensive glandular involvement or extensive adhesions the operation of gastroenterostomy is indicated. The author then reviews the various methods of pylorotomy which have been employed. He also discusses the operation of pyloroplasty, gastrorrhaphy, or gastroplication and gastrogastrostomy for hour-glass stomach, tumors of the stomach, hernia of the stomach, gastrectomy, and gastric ulcer. In discussing the subject of **total gastrectomy**, he says that he cannot but conclude that abstinence from such extensive operations is the best course for the average surgeon. In the hands of surgeons of exceptional skill and wide experience the operation will be advisable in rare and unusually favorable cases.

Keen then takes up the subject of **gastric ulcer**, considers its situation, its frequency, its diagnosis, and the diagnosis of perforation. He tells us that perforation usually follows slight exertion and is announced by pain, spontaneous, intense, and localized in the left upper quadrant of the abdomen, attended by collapse and followed by evidences of peritonitis. The abdomen is at first rigid, but becomes distended by meteorism, intestinal peristalsis ceasing, and vomiting being frequently absent. In many cases of perforation of the stomach the liver-dulness does not disappear. If there is any doubt as to perforation, perform an exploratory celiotomy. If a nonperforating ulcer does not yield to medical means, there are 3 surgical methods of treatment. The first 2 are pyloroplasty and gastroenterostomy, the object of both being to put the ulcer as far as possible at rest. A third method of treatment is excision of the ulcer. This has been done in a number of instances by pylorotomy, but the author refers particularly to those cases of resection of a portion of the wall of the stomach which are properly termed **partial gastrectomies**. This operation was first done by Czerny, who in 1882 excised an ulcer, with recovery. Keen performed this operation with success in 1892. He strongly believes that if a case of gastric ulcer does not recover within a reasonable time by medical means, that partial gastrectomy should be performed, not only because of the malnutrition which will result from the presence of the ulcer, not only because of the impairment of health by pain and the possibility of serious hemorrhage, but also because of the fact that the ulcer may undergo malignant degeneration. The author then discusses the operation for **hemorrhage from ulcer** of the stomach. He says that a hemorrhage may occur in 2 forms: a furious hemorrhage, destroying life from the first; or repeated small or moderate hemorrhages, which gradually drain the patient's strength.

Mikulicz says there are but 2 cases on record in which the vessels have been tied. Hartmann maintains that hemorrhage can usually be stopped by rest, absolute diet, and bandages to the 4 extremities. At the present time the indications for operation rest in suspense. Heydenreich believes that to Hartmann's method of treatment the transfusion of saline fluid should be added. Dieulafoy urges immediate operation in every case of loss of half a liter or more of blood, especially if it occurs within 24 hours. Keen believes that the conclusion of Mikulicz and Hartmann to abstain from intervention is the better warranted course. For the cases of repeated hemorrhages surgery offers the best relief, for we can select a time in the interval between attacks when the patient's strength is fairly good and perform an operation, the proper operation being either pyloroplasty or gastroenterostomy. The treatment indicated in **perforated gastric ulcer** is very clear and should be instantly instituted. First, all food should be stopped. If a meal has been taken shortly before perforation, the stomach should be emptied of food, not by lavage, but by the stomach-pump. The operation should not be delayed in the hope that shock will pass off, for in such cases shock will only pass into a fatal peritonitis. Incision may be either in the middle line, above the umbilicus, or a vertical incision may be made to the left of the middle line. In some cases, after the median incision has been made, it is found necessary to make a second at a right angle to it, toward the left. When the diagnosis is absolutely certain the best incision is one which is parallel with the border of the ribs, or a curved flap may be made, with its base toward the rib. A large proportion of gastric ulcers which perforate do so toward the cardia, as it may be that a left oblique incision or a flap will give much better access. After the stomach has been exposed the opening must be searched for methodically. It will usually be quickly found upon the anterior wall. If it is not found there, the cardia should be examined well, the pylorus, and finally the posterior wall. An area of congestion or visible escape of gastric contents will aid the search. The injection of air through the stomach-tube may reveal the site of the ulcer by the bubbles of air. In some cases the edges of the rupture have been pared, and in others the edges of the rupture have been merely inverted and the wall of the stomach sutured by Lembert sutures, and this seems the best rule to follow. A careful search should be made for possible perforation or threatened perforation by a second ulcer; and if the area of threatened perforation is found, the thinned stomach-wall should be inverted and gastrorrhaphy performed by Lembert sutures. An ulcer in the posterior wall of the stomach may be detectable by the finger, though the anterior wall intervenes, and yet not be accessible from behind by reason of adhesions. Küster reported a case of this kind, in which he incised the anterior wall and found the ulcer. He performed gastroenterostomy. If it is found impossible to invert the edges of the ulcer by reason of the thickness of the stomach-walls, the existence of adhesions, or the great size of the opening, the surgeon should follow Senn's plan and apply an omental graft. The author then discusses the statistics of the operation, and publishes a table prepared by himself and M. B. Tinker, including 78 more recently recorded operations for perforated gastric ulcer, in addition to the 78 cases already tabulated by Weir and Foote.

DISEASES OF THE PERITONEUM, INTESTINES, AND MESENTERY.

N. Senn¹ discusses the classification and surgical treatment of **acute peritonitis**. He says that an intelligent discussion must be based on a

¹ Med. Rec., Aug. 28, 1897.

rational classification, the classification including the anatomy, pathology, and etiology of the disease. It is important in the discussion of the surgical treatment of peritonitis to make a clear distinction between the different clinical forms. The author then suggests the following clinical classification:

"Syllabus of Classification of Acute Peritonitis.—*Anatomic.*—Ectoperitonitis, endoperitonitis, parietal peritonitis, and visceral peritonitis—viz., mesenteritis, epiploitis, perigastritis, pericenteritis, perityphlitis, periappendicitis, pericolicitis, perihepatitis, perisplenitis, pericystitis (urinary and gall-bladder), perimetritis, perisalpingitis, perioophoritis, pelvic peritonitis, diaphragmatic peritonitis.

Etiologic.—Traumatic peritonitis, idiopathic peritonitis, perforative peritonitis, metastatic peritonitis, puerperal peritonitis, peritonitis infantum, fetal and intrauterine peritonitis, peritonitis neonatorum.

Pathologic.—Diffuse septic peritonitis, putrid, hemorrhagic, suppurative, serous, and fibrinoplastic peritonitis.

Bacteriologic.—Streptococcus-, staphylococcus-, pneumococcus-, Bacillus coli commune-, gonococcus-, and tubercle-infection.

Clinical.—Ectoperitonitis, general septic peritonitis, perforative, circumscribed, hematogenous, visceral (see under anatomic), pelvic, puerperal, and subdiaphragmatic peritonitis."

He defines ectoperitonitis as an inflammation of the attached side of the peritoneum, and this form of inflammation tends to be limited. It may, however, be diffuse when in the cave of Retzius or the retroperitoneal space. In a wound of the ectoperitoneum in which the peritoneum is exposed, but not perforated, the primary ectoperitonitis may lead to infection of the serous surfaces through the lymphatic system. A peritonitis of visceral origin is always preceded by ectoperitonitis. A suppurating area in ectoperitonitis is treated by incision and drainage; but if treatment is neglected the suppurating inflammation may perforate into the peritoneal cavity. General septic peritonitis is an inflammation of the entire peritoneal sac, due to the presence of purulent infection, the patient dying from the introduction into the circulation of septic material. In suppurative peritonitis the microbic cause is present in less quantity or is less virulent, and sufficient time intervenes between the beginning of the attack and the operation, or both, for the formation of pus. Every acute peritonitis is septic; but the term septic is best limited to cases of diffuse peritonitis, in which, as a rule, death occurs in a few days, before the gross pathologic lesions have had time to develop. The disease is almost uniformly fatal with or without operation, and the claim that such cases have been cured without operation must be accepted with great allowance. Acute general peritonitis is essentially a streptococcic malady. It is observed most frequently after perforation into the free peritoneal cavity of an abscess containing septic pus, rupture or perforation of any of the abdominal or pelvic viscera containing septic material, gunshot- or stab-wounds of the abdomen, with injury or wound of the intestinal canal, and occasionally as the result of wound during laparotomy. The gravest form of puerperal sepsis is the diffuse septic peritonitis. The very virulent septic matter forms in large quantities, and is rapidly absorbed by the stomata of the under surface of the diaphragm. Surgery has done much toward the prevention of this malady, but very little toward saving life after it is once fully developed. A careful analysis of the cases reported cured after laparotomy shows that most of them were not genuine cases of septic peritonitis, but cases of more or less localized inflammation of the peritoneum, with or without suppuration. Senn has opened, drained, and washed out the peritoneal cavity in many cases of diffuse septic

peritonitis, without a single successful result. The author says that a general discussion of the medical treatment of peritonitis is out of place in his paper, but he makes a few remarks as to what the surgeon should do and should not do in the way of medical treatment when he assumes charge of a case. Only liquid food and stimulants are given by the stomach. If there be nausea and vomiting, rectal enemata are of the greatest value. The thirst may be relieved by high rectal enemata of warm water, or by hypodermic infusion. Tait taught years ago the value of saline cathartics in the prevention of peritonitis and its treatment during the incipient stage, and his teachings are supported by clinical observation and by experimental investigation. The best treatment for septic conditions after an abdominal section consists in the administration of 30 or 40 gr. of Epsom salt every hour or every other hour, until the bowels move freely. This treatment will not unusually abort a threatened peritonitis. If the stomach is intolerant, we can give an hourly dose of calomel and administer saline enemata. One of the great dangers of peritonitis is rapid distention and paresis of the intestines, conditions which are provoked by opium, and can be averted by early and free catharsis. The use of cathartics is absolutely contraindicated in peritonitis caused by perforation, and in such a case the use of opium is proper, as it diminishes shock and lessens the extravasation of septic material. Strychnin, camphor, and alcoholic stimulants should be employed in all cases of grave peritonitis. The application of ice or the cold coil over the abdomen frequently diminishes tympanites, and prevents overdistention and paresis of the intestines when tympanites appears; but if the heart's action is weak and the capillary circulation is sluggish, hot applications should be used in preference to these cold applications. There can be no difference of opinion as to the advisability of early operative treatment in the management of general diffuse septic peritonitis. Without operation death is certain, and early operation may succeed in arresting further progress in cases in which it would become diffuse, and in diffuse cases it may occasionally save life. Senn then discusses the proper incision, the question of evisceration, irrigation, incision of distended intestine, drainage, intraintestinal saline injections, and the further treatment of the cases. He thinks that after operation Marmorek's streptococcus-antitoxin may prove a useful adjunct. Senn then considers perforative peritonitis, circumscribed peritonitis, hematogenous peritonitis, visceral peritonitis, pelvic peritonitis, and puerperal peritonitis.

Max Nassauer¹ discusses the subject of **tuberculous peritonitis treated by celiotomy**. He states that many cures have been reported, but the time that has elapsed after the operation in most of them is too brief to assert that the cure is permanent. Winckel maintains that 5 years should elapse without recurrence before the case can be claimed as a cure. Only 15% of the reported cases have been under observation over 2 years, and the majority of them have been under observation less than a year. The question of tuberculosis in other organs must be taken into consideration. Primary tuberculosis of the peritoneum in the female arises from direct implantation by way of the oviducts, and these oviducts are usually infected. The majority of reported operations have been done in females, but the majority of autopsies in which tuberculous peritonitis was found have been upon males. It is probable that the condition is more often diagnosticated in females than in males, because they are more apt to consult specialists, and because the symptoms are marked and pronounced, owing to physiologic congestions accentuating the disease and its symptoms. Over 1000 cases have been reported as cured, but in few of these

¹ Münch. med. Woch., Apr. 19, 1898.

has there been anatomic evidence of such a cure or a sufficient duration since the time of operation to insure against a recurrence. Nassauer reports a case in which the patient rapidly improved after operation, becoming entirely well, except that for 3 months there was a tuberculous ulceration in the lower portion of the celiotomy-wound, although this finally healed. Two years later the woman seemed absolutely well, except for slight pulmonary symptoms. Three months subsequently she came back, and an intraligamentary cyst was removed by a posterior colpotomy. Although careful search was made at the time of operation, no signs of the original tuberculous trouble could be found, and when seen $2\frac{1}{2}$ years after this patient was well and without symptoms. A portion of tissue removed at the first operation was found to be tuberculous. [The above case is important, and affords sound evidence that opening the abdomen can cure tuberculous peritonitis.]

Parker Syme¹ presents a study of the **surgery of tuberculosis of the peritoneum**. He says that in the majority of cases of tuberculous peritonitis laparotomy will produce a permanent cure. A variety of theories have been put forth to explain why laparotomy should cure: First, that the cure is due to the use of chemical germicides; second, that it is due to the use of drainage; third, that it is due to the exposure of the abdominal cavity to sunlight and air; fourth, that the removal of ascitic fluid alters the blood-circulation; fifth, that bacteria may be introduced, which do good by producing a toxalbumin fatal to tubercle-bacilli; sixth, that the traumatism establishes fibrinous peritonitis, the bacilli becoming encapsuled and their growth being arrested; seventh, that the cure is owing to the advent of multitudes of leukocytes, and hence results from phagocytosis; eighth, that the mere opening of the abdominal cavity brings about a physiologic change in the peritoneum which makes it cease to be a proper soil for the growth. Not one of these theories can be demonstrated to be true, and some of them may be discarded. Cure does not depend upon the use of disinfectants, because in a long series of cases cure was obtained when no such agents were employed; in fact, there are more cures reported without the use of such agents than with them. That cure is not brought about by the relief of pressure due to the withdrawal of ascitic fluid and the consequent improvement of the blood-circulation, is shown in cases in which tapping does not benefit the patient. That drainage is not the reason of the cure is shown by the fact that patients do better without drainage than with it. The other theories cannot be either proved or disproved, but it should be borne in mind, for instance, that a tuberculous joint cannot be cured by exposing its interior to sunlight and air. We are forced to the conclusion which Tait arrived at, that opening the abdomen produces a change in the physiologic character of the peritoneum which makes this membrane able to destroy the tubercle-bacillus. Syme says that the danger of the operation is very slight, the death-rate being below 3%; that sepsis is less apt to occur than in operations upon healthy peritoneum; that tuberculous infection of the wound does not occur; that disinfectants are useless; that drainage is likely to result in a permanent sinus; that an operation, even if unsuccessful, does no harm; that the existence of pulmonary tuberculosis which is not advanced in association with peritoneal tuberculosis makes the operation more than ever necessary, because the improvement gained in the abdominal condition improves the general condition, enables the patient better to resist the phthisis, and if the pulmonary tuberculosis is but incipient recovery takes place. Laparotomy is the proper form of treatment for these cases. Pathologically we recognize three varieties of peritoneal tuberculosis

¹ Med. Rec., Apr. 2, 1898.

as classified by Aldebert: the ascitic form, the fibrinous form, and the ulcerous form. They may be better expressed by naming them the ascitic, the fibrinoplastic, and the caseous or suppurative. These are not distinct varieties, but are merely stages of one disease. When the ascitic and plastic are combined we may often have localized encysted fluid, which may readily be mistaken for cystic tumors. When the ulcerous or caseous form is encapsulated by localized adhesions the mass can often be felt as a distinct tumor. Clinically we recognize two classes, with ascites and without ascites. The peritonitis which is a part of an acute miliary tuberculosis is not amenable to surgical treatment. The incision should be large enough to allow satisfactory exploration of the abdominal cavity. When hydrops exists the fluid should be evacuated. When there is an encysted mass consisting of fluid or granulation-tissue it is well to separate the adhesions and carefully sponge out the cavity, provided there will not be too much tearing and bleeding, otherwise it is better not to make much manipulation. If possible, the original focus of disease should be removed. This can usually be carried out when the female pelvic organs or the vermiform appendix is the site. The more simple the operation and the more readily it is performed the better will be the result, and we should not irrigate or attempt medication of the abdominal cavity; the wound should be closed by suture without drainage, and as soon as possible under the best hygienic conditions. Several hundred cases are on record. Some claim that 80% are cured; some claim that but 24% are cured. A fair conclusion is the following: Marked improvement occurs in about 80% of cases, and a permanent cure is effected in about 30% of all cases operated upon. The author then gives a list of some of the important articles on the subject which have been published. [We think it important to call attention to the fact that operation is *not always* necessary. In a fair percentage of young persons it is possible to cure the disease by placing the individual under proper hygienic conditions, giving tonics and nutritious food and counterirritating the abdomen. In some cases aspiration undoubtedly does do good; but in most cases it fails. If a patient declines a cutting-operation, but will consent to aspiration, the latter procedure should be given a trial.]

Frederick Kammerer¹ reports 3 cases of **strangulation of the intestine** by Meckel's diverticulum. One patient recovered completely, 1 died, and 1 left the hospital with a "preternatural anus." These 3 cases were instances of the most common form of strangulation by the diverticulum, the point of the diverticulum in each case being adherent to some "point within the abdomen," and thus forming a loop or band which caused strangulation. Kammerer refers to the paper of Neumann (Virchow's *Festschrift*), Boldt's paper, and the article of Treves, and tells us that in looking over the literature since 1890 he finds, including his own 3 cases, 16 cases, in 10 of which it is recorded that the tip of the diverticulum had an attachment. By taking Neumann's statistics, Boldt's cases not included in Neumann's table, and the above 10 cases, it is found in 33 cases the attachment was to the mesentery, in 13 to the umbilicus, in 8 to the abdominal wall, in 12 to the intestine and other abdominal viscera (66 cases in all).

In Kammerer's first cases the attachment was not due to inflammation, but to the obliterated omphalomesenteric vessels. Leichtensen and Fitz have called attention to the fact that many so-called inflammatory adhesions of the end of the diverticulum do not present the characteristics of peritoneal adhesions. Both Fitz and Neumann showed by dissection of such cases the obliterated remains of the omphalomesenteric vessels. The

¹ Ann. of Sur., Aug., 1897.

author then discusses the general question of strangulation by Meckel's diverticulum.

James E. Thompson¹ writes on **intestinal obstruction caused by Meckel's diverticulum**. He reports a case in which acute strangulation of the ileum took place under a bridge formed by Meckel's diverticulum; symptoms lasted 5 days; operation was performed and death occurred. He also reports a case of strangulated inguinal hernia (left); prolonged taxis was employed, rupture of the gut occurred, with diffuse peritonitis and death, the rupture being at the root of Meckel's diverticulum. The first patient, while in robust health, was taken suddenly with severe griping-pains in the abdomen, and in a few hours vomiting began. The pain was generalized. The following day his physician prescribed purgatives, with the result that vomiting and pain increased and no movement of the bowels took place. The next day the vomited matter became offensive; purgatives were discontinued and morphin was administered; on the next day the vomited matter was stercoraceous. The abdomen was opened, when greatly distended bowels appeared at the opening and were with great difficulty kept from protruding. A futile search was made with 2 fingers in the abdominal cavity, and the incision was enlarged. A piece of small intestine was discovered firmly fixed near the right iliac fossa, and this loop passed under a tight band. The intestine was released by traction. The band was found to be a Meckel's diverticulum, with its free end attached to the base of the mesentery of the part of the ileum from which it sprang. The diverticulum was about $1\frac{1}{2}$ in. long and $\frac{1}{4}$ in. in diameter, and it rose from the convex border of a portion of the ileum about 2 feet from the ileocecal valve. From the apex of one of the apical horns a short, thin cord ran to the base of the mesentery, almost over the right common iliac artery, and this cord contained an artery of considerable size. A ligature was placed on the cord, the diverticulum was amputated at its base, and the opening into the ileum was closed by a Lembert suture. It was found impossible to replace the bowels without emptying their contents, and an incision was made in another coil. The bowels were replaced, the abdominal cavity was washed and cleansed, and a glass drainage-tube was inserted. This patient died. Thompson tells us that the true Meckel's diverticulum represents the vitelline duct, which extends from the primitive intestinal canal to the umbilical vesicle. In its most perfect form it passes from the lower portion of the ileum to the umbilicus, opening freely into the intestine, and at the navel being either open or closed. The lumen of the diverticulum may perhaps exist as a solid cord, extending from the apex of the patent process to the umbilical cicatrix. If this cord is long and redundant, it may be drawn into loops, through which intestine may pass and strangulate. Again, the diverticulum may exist as a free tube, arising from the ileum and lying unattached in the peritoneal cavity, in which condition it is harmless, as true inflammatory condition of its contents is rarely met with. Fitz has been able to collect only 3 cases of true inflammation around such a process. The attachment of the apex of the diverticulum to different parts of the abdominal cavity opens up a most interesting subject. Most commonly it is attached to the base of the mesentery. The author then quotes Kammerer's statistics (see previous article). Thompson's 2 cases increase the list to 68, and give 1 attachment to the mesentery and 1 to the abdominal walls. It seems probable that in some cases the fibrous, cord-like attachment to the umbilicus is torn and the end of the diverticulum hangs over into the abdominal cavity, subsequently becoming reattached to some of the contiguous viscera. This explains

¹ Ann. of Surg., Apr., 1898.

an attachment to another coil of intestine or to the orifice of the hernial sac; but an attachment to the mesentery is not a secondary adhesion, but is truly embryonic, and results from persistent omphalomesaraic vessels.

Treves has pointed out the occurrence of these attachments of the diverticulum to places other than the umbilicus as "secondary adhesions." Falk explains the subject as follows: Along the course of the vitelline duct originally two omphalomesaraic arteries pass; the left disappears, but the right remains as the superior mesenteric artery of the adult, the terminal branch of which accompanies the diverticle, if one persist, as far as the umbilicus. With the disappearance of the vitelline duct occurs a similar obliteration of the omphalomesaraic artery; but occasionally the duct may disappear, and the vessel remains coursing across the abdominal cavity, from the root of the mesentery to the anterior abdominal wall, as a solid cord, having no connection with the intestine whatever.

Leichtenstern makes mention of certain congenital ligaments starting from the mesentery, very close to the intestine, at the usual height where diverticles are given off, and running upward toward the root of the mesentery, to which they become attached. The ligaments are never hollow, but represent the obliterated vasa omphalomesaraica passing between the root of the mesentery and the intestine.

In Case I. the cord containing the artery remained intact and curiously retained its artery with the lumen unobliterated, and along this blood passed to the apex of the diverticulum.

Case II. is quite unique. Meckel's diverticulum has been found in the sac of a hernia many times. There can be no doubt in Thompson's case that the hernia was not reducible for years, and was only reduced on the day of admission to the hospital, after prolonged effort upon the part of the patient; the cause of the irreducibility was probably due to adhesion of the diverticulum to the wall of the sac. The diverticulum in this case is free from the suspicion of a terminal cord, but shows near its apex, the adhesions being secondary, the result of adhesive peritonitis.

Edmund J. A. Rogers¹ reports a successful **operation for intestinal obstruction in an infant, 64 hours old.** A median incision was made circling the umbilicus and extending in both directions. A large amount of fluid ran out, and some loops of distended small intestine appeared. They were removed from the cavity and the small intestine was examined. The upper third of the small intestine was distended, and on following the gut down it was found that it bent suddenly backward, and all distention ceased. The small intestine was discovered to be closely bound to the posterior portion of the cavity by a transverse band passing directly across it. The intestine was not adherent to the band. The band was divided into 2 parts, tied with catgut ligatures, and the central portion cut away. The abdomen was neither flushed nor irrigated, and the abdominal wound was closed. The patient was under the influence of chloroform for 35 minutes, and made a complete recovery. [In children shock is apt to be profound. It is necessary to operate quickly, to keep the patient warm, to avoid chilling with wet cloths or cool fluids, to arrest hemorrhage thoroughly, and to give as little of the anesthetic as possible. It is wise to have an assistant give an intravenous saline injection during the operation. Hypodermic injections of strychnin or camphor are of benefit.]

Sir William Thomson² delivered an address upon **operation in intestinal obstruction.** He says that many conditions which threaten life present

¹ Med. News, Oct. 2, 1897.

² Dublin Jour. Med. Sci., Dec. 1, 1897.

symptoms of an almost identical character. Three of these symptoms are supposed to be typical: pain, vomiting, and constipation; but if we apply them as a test to the understanding of a case, we find we are bound to include such affections as peritonitis, gall-stones, volvulus, strangulation, pressure of tumors, stricture or calculus of the ureter. Now not all of these require operation of necessity, and therefore we must seek for other ailments. The patient's age, the previous history, the state of the abdomen, the degree of distention, whether the constipation has been chronic or gradually increasing, the character of the urine, the quality of the feces, the temperature, and the constitutional state of the patient, indicating collapse or shock. It is often said that we see these cases too late, and this is true. Usually the surgeon sees the case when the question of operation, and no other question, is to be determined; but if he had seen the patient in the beginning of the attack he would in most cases have been just as reserved as was his medical colleague. All surgeons are not agreed as to the indications for operation. For instance, Jonathan Hutchinson has advocated taxis in obstruction. The author quotes the late Sir Benjamin Ward Richardson approvingly. Richardson said, a number of years ago: "I fail to find in the list of examples which have come under my notice during a long career, one single instance in which recovery has taken place after the appearance of stercoraceous vomiting in the acute form, except in cases in which operation was carried out." If the diagnosis is obscure, exploration is justifiable. Thomson's argument in such a dilemma now would be: "Because we are in the dark, let us let in the light." Thomson then considers in order the symptoms which belong to acute obstruction. Vomiting attends many states which have nothing to do with obstruction; but the vomiting of obstruction has certain peculiarities. It is not the first symptom; but it follows abdominal pain, which pain has come on suddenly or gradually. The vomiting varies as to quality, and this has a certain relation to the position of the obstruction. If the obstruction is in the duodenum or jejunum, vomiting comes on very quickly, because these viscera are sensitive; but the material ejected is not really stercoraceous. It first consists of stomach-contents, and then of matter undergoing digestion in the upper portion of the intestinal canal; but as the obstruction is lower down toward the end of the small bowel or in the large intestine, the vomiting begins at a greater interval from the origin of the attack, passes through the stages above noted, and then becomes stercoraceous, as we often see it in strangulated hernia. The late Greig Smith laid down as a working-rule that operation should be undertaken if pronounced vomiting had occurred 3 times. Of course, there is no special virtue in the number. It only gives a reasonable time to make the character of the symptom clear. Pain is of value in locating the trouble in the abdomen; but it does not often indicate the actual site of obstruction. In chronic obstruction it is not severe; in acute obstruction it comes on suddenly and is very violent. Sometimes there are intervals of ease; sometimes the pain is almost continuous. But little reliance is to be placed upon the evidence offered by the temperature. Constipation depends largely upon the position of the trouble. If the difficulty is high up in the intestines, the bowels may continue to move for some time, and there may be even diarrhea for a day or two. If the obstruction is in the large intestine, there is usually constipation from the outset, although occasionally a loaded rectum below the obstruction may discharge its contents. Much weight has been given to the existence of dulness in the loin in these cases, due to free fluid in the peritoneal cavity. It is not always present. It depends upon peritonitis; but that is not always of a serous variety, and no appreciable

exudation may be present. When it is present it is a valuable aid, and it should be sought for. We may think there is fluid in the loin, when in reality the signs are due to fluid and gas within the intestine itself. Increase in the indican of the urine was pointed out by Jappe to exist when the small bowel, but not the large intestine, is obstructed. Barlow, in 1844, declared that the urine was suppressed in proportion to the nearness of the obstruction to the beginning of the small intestine, and that suppression does not occur where the large intestine only is engaged. This, however, is not invariably true. It is important to note the character of the distention and the time of its appearance. It is slow to appear when the trouble begins in the large bowel; but when it once begins it extends with great rapidity. If the small intestine is obstructed high up, the abdomen ought not, theoretically, to become distended; but things often occur in surgery to upset our expectations. If peritonitis arises, adhesions may take place or bendings occur, which arrest the passage of flatus; or the injury to the bowel may be such as to produce paralysis and be followed by the accumulation of gas within the gut. We must also note the general condition of the patient, the character of the facial expression, and the degree of collapse. If we are able to apply the above tests to any case, we should have little difficulty in dealing with it; but, unfortunately, we rarely can apply all of these tests, and our success will depend upon the ability with which we can select such a combination of tests as will lead us aright. The greatest value is to be placed upon stercoraceous vomiting as a sign. In the vast majority of cases of acute obstruction there is no room whatever for medical treatment; it is time lost. Taxis is not to be employed. Here and there a case may recover without operation; but in order to apply taxis successfully the surgeon should know the locality of the obstruction, and also the nature of it, before he begins to manipulate the whole mass of intestines. What would result from taxis if a nipped bowel were almost gangrenous, or if the intestine were distended like a drum? The opposition on the part of some to operation is founded on the knowledge of the many fatal results that have followed operation; but these are becoming less in number as the great gravity of the affection is being realized. We may ask, in return, What proportion of cases recover in which operation has not been performed? We hear occasionally of the sloughing of a volvulus and of recovery; but how often? Such events are practically miracles, and we do not conduct the ordinary affairs of life on the supposition that a miracle is likely to happen, and yet that is practically what the practitioner of medicine is doing who depends upon medicine to cure a strangulation. If the nature of the case is recognized there is only one thing to be done, and that is to make an exploratory incision. It is not the opening of the abdomen that kills; it is the fact that this operation is usually done when by delay everything is arrayed against success.

Julius H. Hochene¹ gives a description of a **new form of intestinal obstruction**. He calls it *combinierter Ileus*. It consists in a partial chronic obstruction of the colon, usually in the neighborhood of the splenic flexure, and complete acute obstruction just above the cecum. He reports 4 cases, and in 2 of these the condition was due to hernia, in 1 to a misplaced spermatic cord, and another to a peritoneal adhesion. The chronic obstruction in the colon was 3 times produced by carcinoma and once by a scar. The pathogenesis of the condition appears to be as follows: The stenosis of the colon becomes gradually more pronounced, until finally stagnation of the feces results; then the obstruction in the ileal region develops, and its symptoms overshadow

¹ Wien. klin. Woch., Dec. 23, 1897.

those of the other lesions. The muscular colon forces its contents through one stricture or the other, and the obstruction of the small intestine is the only condition which is evident; and if an operation is performed early, the secondary condition is apt to be overlooked; and if it is performed late, the primary condition is rarely discovered. As a consequence, operation often fails to give permanent relief. The symptoms of this condition are as follows: There is vague uneasiness in the neighborhood of the colon-stricture just as the acute stage begins; there is distention of the colon that subsequently disappears, and when this disappears there is found to be distention of the small intestine, the symptoms no longer being those of obstruction, but having become those of strangulation. If the abdomen is opened, the small intestine is seen to be greatly distended and the obstruction is found. The colon is collapsed, and it may be observed that the wall of the transverse colon is thicker than that of the descending part; and this hypertrophy may be very extensive. Hoche-negg suggests that the proper proceeding is to do an enterostomy as a temporary measure, and subsequently to resect a portion of the colon.

J. B. Bradbury¹ reports 2 cases of **obstruction of the small intestine by gall-stones**. The first patient died, and at the necropsy a stone was found impacted in the jejunum. This stone had passed through a large opening in the gall-bladder and into the duodenum. The second patient had an attack of obstruction, and subsequently passed a large gall-stone. Only 1 case of intestinal obstruction from gall-stones occurred in the Manchester Royal Infirmary from 1883 to 1896, and during this time 50,000 patients were treated. Each of the stones in the cases reported above must have ulcerated into the bowels and produced a fistula. In both the cases the vomit was like pure bile, but near the end of the first case it became slightly stercoraceous. Impaction of gall-stones is usually in the ileum. In neither of the cases was the pain particularly severe. In most of the cases of obstruction from this cause in Naunyn's table, the duration of the symptoms was from 2 to 10 days. The mortality is large; Schüller says 56%; Courvoisier, 44%. Naunyn does not think that surgical intervention is to be warmly commended. Recovery may occur after the symptoms have lasted for a week or more. 50 % of cases treated medically recover.

W. J. Cant² reports 3 cases of "obstruction of the small intestine by gall-stones." In the first case the stone was in the lower ileum, and was removed by laparotomy. The patient died in a week. In the second case the patient was collapsed. A large gall-stone was removed, but the patient died. In the third case a large gall-stone was removed and the patient recovered. In 2 of the cases an attempt was made to break up the stone with a needle (suggestion of Teale, of Leeds), but it could not be done. None of these patients had previous symptoms of gall-stones, but only bilious attacks, nor had they before the obstruction suffered from pain. Cant does not believe that cases of this description are as uncommon as is supposed. [It is impossible to diagnosticate the acute obstruction which may be produced by gall-stones unless we know the history, as the obstruction causes no symptom different from other forms of acute obstruction. Raymond³ has shown us that the gradual form can be recognized. He tells us that the condition begins gradually, and is first announced by increasing constipation, the constipation becoming absolute when the lower bowel becomes empty. The man is at this stage not seriously ill, and generally walks to the physician for advice. There develop anorexia, nausea, weakness, colicky pain, and at last characteristic symptoms of obstruction

¹ Brit. Med. Jour., Sept. 25, 1897.

² Ibid., Oct. 30, 1897.

³ Thèse de Lyons, 1897.

appear. The vomiting rarely becomes actually stercoraceous, and the symptoms are notably remittent. In some cases really dangerous symptoms do not appear for 3 weeks. In making a diagnosis the history of previous gall-stone colic is very important.]

Jordan¹ has made an experimental study on dogs to determine the value of **omental grafts in cases of intestinal resection**. In every case he considers that the graft did harm. In dogs which were killed soon after the operation the grafts were found thickened and adherent to coils of intestine; and in dogs killed at a later period it was found that the graft became a fibrous mass, which constricted the bowel or produced an angle in the intestine or folds of mucous membrane, or matted together coils of intestine by adhesions, making it difficult to separate them. These conditions would be liable to be followed by intestinal obstruction, and, even if this did not arise, would cause pain and disability. The author does not think that omental grafting should ever be resorted to.

Engstrom² discusses fatal **paralysis of the intestine** occurring after abdominal operations. He does not believe that this invariably results from sepsis. He speaks of 4 cases in which death followed operation; in 1 case 57 hours afterward, in another case 7 days, in another 8 days, and in another 10 days. In not 1 of these cases was there the slightest evidence of peritonitis; and in 1 case a bacteriologic examination made of the abdominal contents 1 hour after death showed that they were entirely sterile. The author thinks that the most important element in the treatment of such cases is the administration of food and stimulants; if necessary, by the rectum.

Senn³ discusses the **surgical treatment of intestinal tuberculosis**. He tells us that a localized primary intestinal tuberculosis can be treated surgically, though, of course, a diffuse tuberculosis and a secondary tuberculosis should not be operated upon. It is well known that peritoneal tuberculosis can be successfully treated by abdominal section. Senn reports a case in which tuberculous ascites occurred after incision and drainage, and on two different occasions, but which was cured by tapping and injection of iodoform. A tuberculous ulcer of the intestine may lead to a circular stricture, and this circular stricture may be treated by circular suturing. If the enlargement is movable and causes symptoms of obstruction, intestinal resection followed by circular suture is the proper operation. If the disease is not limited to the organ where it primarily arose, or where it is complicated by pulmonary or general tuberculosis, it is useless to perform a radical operation, and an enteroanastomosis should be made. In operating upon an area of intestinal tuberculosis the caseous mesenteric glands should be removed, the portion of mesentery including them being embraced in the excision. Senn reports a case of tuberculosis of the cecum and ileum in which he resected the cecum and 18 inches of the ileum, with a portion of the mesentery, and effected lateral anastomosis by means of bone-plates, the patient making a thorough recovery; but the recovery was only temporary, and the disease recurred in 6 months. The author thinks that he should have repeated the operation, as in these tubercle-cases repeating the operation may bring about a cure. Senn has found by experiments on animals that a partial exclusion of the intestinal canal by enteroanastomosis does not lead to fecal accumulation in the bowel, and in certain cases which will not tolerate excision the operation will relieve intestinal obstruction and give rest to the diseased parts. Experiments show that after complete exclusion, in which a portion of the intestine is isolated and its ends closed by

¹ Lancet, Oct. 30, 1897.

² Centralbl. f. Gynäk., Sept. 11, 1897.

³ Jour. Am. Med. Assoc., May 21, 1898.

invagination, there is danger in the retention of intestinal secretions. This danger may be lessened by establishing a fistula in connection with the excluded portion; but in such an operation the danger to life is almost as great as in resection, and the procedure is not warranted by any compensating advantage. Senn thinks that as our knowledge of the etiology and pathology of intestinal tuberculosis increases we will operate more and more frequently and with better results.

Lucius W. Hotchkiss¹ records a unique case of **intestinal fistula**. In this case a ventral hernia existed; the skin above the ventral hernia ulcerated, and the ulceration opened into the intestine. This case was treated by resection of the gut, circular enterorrhaphy by Maunsell's method, and the repair of the ventral hernia. The patient recovered. The ulceration in this case was evidently due to simple pyogenic infection through an abrasion, and its extension was due to lack of vitality in the thin cicatrix.

Theodore A. McGraw² discusses **intussusception of the vermiform appendix and cecum**. He reports a unique case. A boy, 7 years of age, had an attack of cholera morbus, accompanied by frequent bowel-movements, vomiting, pain, and great straining. Once or twice the discharges contained a little mucus and blood. In a few days the boy was restored to an apparently normal state, but every few days he was seized with agonizing abdominal pain, unaccompanied by vomiting or fever. The pain was epigastric and there was some tenderness at the navel. He had a bowel-movement daily, and occasionally after an attack the evacuation contained a little bloody mucus. No tumor could be felt in the rectum or iliac fossa. During 4 months the seizures became more violent and the periods of comfort more brief. The abdomen was opened above the umbilicus, in the median line. The transverse colon was red, inflamed, and coated with lymph. The ascending colon had such an extremely long mesocolon that the cecum was easily drawn through the incision above the umbilicus. The entire ascending portion was red and inflamed. The cecum was of the fetal type, with an appendix emerging from its end. The cecum and the appendix were found invaginated, making a tumor as large as a walnut within the gut. The ileum was not invaginated and the ileocecal opening was patent. It was considered unwise to attempt reduction after the prolonged duration of the condition. The cecum was amputated at the neck of the intussusception, and the opening was closed by a row of catgut sutures through the mucous membrane and another row through the serous surface. The intestinal wound was covered with omentum, which was fastened in place. This patient completely recovered. This case presented an inversion of the lower end of the colon, without obstruction and without strangulation. McGraw has found in the literature but one report of a pure case of intussusception of the end of the cecum and the appendix into the cecum, and considers that case doubtful (John McKidd, in vol. 4 of *Edinb. Med. Jour.*, 1859). McGraw maintains that in a pure case the producing force cannot act in the same manner as in an invagination in continuity. In the latter case, during violent contractions of the bowel, a contracted portion pushes itself into a relaxed portion below it. In the former case the productive process must be complicated, involving "irregular and violent muscular contractions, changes in atmospheric pressure and external force."

Frederick Holme Wiggin,³ writes upon **infantile intussusception**, makes a study of 103 cases, and records 2 previously unreported cases: 16 cases were successfully treated by enemata and inflation, or both; 23 were un-

¹ N. Y. Med. Jour., Oct. 2, 1897.

² Brit. Med. Jour., Oct. 9, 1897.

³ Lancet, Aug. 28, 1897.

successfully treated by enemata and inflation, or both; 43 were unsuccessfully treated by laparotomy; 21 were successfully treated by laparotomy. Of these cases, nearly 50% occurred during the fourth, fifth, and sixth months. 75.4% of cases were in males, and 89% were of the ileocecal variety. Pritchard has shown how external violence may play a part in producing the disease (carelessly picking up a child and doubling it over a nurse's arm, producing temporary paralysis of a portion of the intestinal tract). Jacobi has pointed out that jumping an infant violently up and down may produce intussusception (this was the chief cause in Wiggin's case). In 1 case a tumor of the gut produced invagination. Intussusception is first made manifest by the sudden onset of violent pain, "followed by vomiting and the passage of stools containing blood and mucus." Tenesmus was marked only in cases where the gut had entered the rectum. An abdominal tumor was rarely absent. In some cases a tumor was revealed by conjoined rectal and abdominal examination, after rectal or abdominal examination alone failed to find it. In 5% of cases there was protrusion through the anus. In 2 recorded cases there was a cure by sloughing (not included in table). If all cases are counted in which distention was tried, we find some which were afterward treated by laparotomy, and the total number is 71. In 53 instances (75.4%) distention failed to effect reduction. This percentage would be the mortality attending this plan, if no other means had been subsequently employed in any case. It is true that a healthy infantile intestine cannot be injured by a hydrostatic pressure of 6 pounds (Curtis); it is certain that the damaged intestine may be injured by such a force (Mole, Mortimer). Mole has proved that $1\frac{1}{2}$ pints of water injected under a pressure of $1\frac{1}{3}$ pounds to the square inch will fully distend an infantile colon, and some of the fluid will pass through the valve. Wiggin would not employ distention; but if it is employed, the following is the proper plan: Place in a reservoir $1\frac{1}{2}$ pints of warm normal salt solution, and never elevate the reservoir more than 3 feet. If one trial fails, abandon the method and employ other means. If it is thought that reduction has been effected, place the infant in its crib, and quiet it "by other means than opiates or motion, to the end that, if reduction has not really been effected," the fact may be made manifest by symptoms at an early period. The history of the treatment of intussusception by distention "is a dark page in that of our science." In the above cases laparotomy was performed 64 times. It succeeded 21 times, or in 32.8% of cases operated upon. The average age of these cases was $6\frac{1}{2}$ months. The average hour from the onset to the operation was the forty-fourth. In 17 of the cases inflation, enemata, or both, had been tried and failed. In 8 cases the invagination was easily reduced. In 10 it was reduced with difficulty. The death-rate after laparotomy was 67.2%. The average age of these patients was $5\frac{1}{2}$ months. The youngest patient operated upon was 3 days old, and it lived for 6 days after operation, and died from inanition (the operator opened the first piece of bowel which presented). One reason for the high recorded mortality is that the operation is usually performed only as a last resort, and when the patient is collapsed (Knaggs, Rydygier). If we only count cases since the perfected technic of abdominal surgery has been generally known (since 1889), we have 18 cases, of which 14 were successful, a death-rate of 22.2%, which is a fair estimate of the risk at the present time if the operation is performed within 48 hours of the onset of the trouble. If an infant suffering from intussusception is in collapse, stimulate it. If the child responds, operate; if it does not, operation will be futile. The median incision is usually employed. In order to reduce the invagination, encircle the tumor with the finger and thumb below its apex, hold the sheath

a few inches lower down, and push the apex of the tumor upward. Never make traction above the tumor. If the tumor is irreducible we can perform Maunsell's operation, although there is no recorded case of a successful operation for intestinal resection or artificial anus in a child under 12 months of age.

Edward Martin¹ presents a statistical study of intussusception in children, based on unreported cases, together with a report of a successful operative case. He accepts the Raffinesque system of classification—that is, that into ultra-acute intussusception, death occurring during the first 24 hours; acute, terminating between the first and seventh days; and subacute, lasting 2 weeks or more. The invagination may be enteric, in which case the small intestine only is involved; ileocecal, in which the ileum and colon with the valve are invaginated into the colon; ileocolic, the ileum prolapsing through the valve and the latter retaining its proper position; colic, in which the invagination involves the colon alone; and rectal, when the trouble is within the rectum entirely. In the majority of cases the upper segment of bowel passes into the lower segment; but in 1.5% of cases the lower segment passes into the upper. A retrograde intussusception occurring secondarily to the descending invagination occasionally occurs, and in such cases the intussusception is surrounded by 5 layers of gut. This occurs only in the colon. The most prominent of the predisposing causes of intussusception are intestinal trauma, polyp, gastro-enteritis, and straining. The chief direct cause is irregularity in the nervous mechanism of the intestine, sudden spasmodic contraction of a segment of the bowel occurring while the adjoining portion of bowel is relaxed. This condition accounts for intussusception of agony, which is occasionally noticed in postmortem examinations, the conditions having developed during or after the death-struggle. These invaginations are limited in extent, exhibit no inflammatory changes, and are often multiple. Disorder of innervation is probably influential in children. Nothnagel discovered, by stimulating a portion of the bowel by a faradic current, that he could produce contraction at the point of stimulation, and that often temporary retrograde intussusception was produced. Just below the seat of firm contraction the bowel ascended in the form of a sheath, which progressively increased until the stimulation was removed, when intussusception was spontaneously reduced.

Hare and Martin, some years ago, made experiments on dogs on the line laid down by Nothnagel. They were able to produce a firm ring-like contraction of the bowel, but did not observe any attempt at invagination. In a very large number of cases of intestinal obstruction it has been found that about 40% are due to intussusception. In 593 cases of intussusception collected by Leichtenstern, 131 occurred before the age of 12 months, and the great majority of these in the fourth, fifth, and sixth months. In the cases collected by Bull and Coley, the average age, excluding children over 2 years of age, was $8\frac{1}{2}$ months. After the fifth year intussusception becomes comparatively rare until the fortieth or fiftieth year, when it again increases in frequency. In the first year of life the ileocecal form is more common than the combined forms of all the others, the ileal invagination being exceedingly rare. If the ileum is involved, it is usually in its lower segment. Intussusception of the colon is commonly found in the sigmoid flexure. The acute form of infants is marked by a painful onset, usually in the ileocecal or umbilical region. After a few hours the child becomes dull and lethargic, and has attacks of pain and restlessness. Vomiting is almost constant until a little while before death; but it is very rarely stercoraceous. As a rule,

¹ Therap. Gaz., June 15, 1898.

there are blood-stained mucous stools. In 108 cases occurring in the first year of life this symptom was present in all but 4. In 63% of the infantile cases reported by Leichtenstern a tumor was felt. It was usually found in the left iliac region, and was best found by combined palpation, the index-finger of the right hand being passed deeply into the rectum, while the fingers of the left hand palpate through the abdominal parietes. This tumor will usually be absent in an ileocecal invagination. It is sausage-shaped, and its size and consistency vary from time to time, and during a paroxysm of pain it is apt to become hard and distinctly perceptible, and in a few minutes afterward it may be impossible to find it. Tenesmus is a not unusual symptom. In some cases there is a patulous condition of the anus, due to paralysis, and, according to Leichtenstern, depending upon invagination of the descending colon and rectum. This does not occur in cases of invagination of the ileum. In the absence of tumor, unless the other symptoms are very markedly developed, the surgeon cannot make a diagnosis between a case of severe enteritis and a case of intussusception. Examination under ether, however, will practically always show a tumor. The prognosis is extremely grave. Leichtenstern thinks the mortality is 73%. Hare and Martin, in 1889, in a series of cases, found the mortality was 90%. In the first year of life the mortality is as high as 80%; death usually occurs between the fourth and seventh days. Records have been made of cases having been cured by massage, but it is a usually futile measure, and will probably do more harm than good. Rectal injections seem to have been nearly as successful as abdominal section. The injection may be of air or liquid. The air-injection is less easily controlled and does not possess the mechanical effect of the liquid-injection. Aside from direct surgical intervention, injection of liquid is the best means of reducing an invagination. If the injection succeeds, the tumor will disappear and the fluid in the irrigating vessel will begin to flow rapidly; if the injection fails, an operation must be immediately undertaken. In fact, it is well before making an attempt at disinvagination by injection, to make all preparations for section. In operating, the median incision is the best. The invagination will be readily found, and reduction can usually be effected by stripping back the intussuscipts by a milking-motion practised with both hands. Traction upon the intussusceptum should not be employed. A probe passed between the entering and returning layers may loosen adhesions. After reduction has been accomplished in this way we may desire to fix the bowel so that the intussusception cannot be reproduced. This can be done by stitching the gut to the parietal peritoneum. If the intussusception cannot be reduced by the above-mentioned method, Maunsell's operation may be employed. Martin says that, whereas intussusception is generally regarded as a common affection, he has been especially impressed with its extreme rarity. As far as he can find out, but 1 case has ever been treated at the Children's Hospital of Philadelphia; 800 personal letters sent out brought reports of only 54 cases. Men of wide experience in medicine, surgery, and pediatrics, stated that they had never seen a case. The average age of the patients was 34 months. The youngest patient was 2 days old, the next youngest was 4 weeks old. In 40 cases tumor was present, in 7 it was absent, in 12 it was not noted. In 46 cases mucosanguineous discharges were present. In 43 cases there was tenesmus; in 8 it was absent. Fifty-three were treated by air- or water-injections; of these, 13 were subsequently subjected to celiotomy. Of the 40 not operated on, but treated by water- or air-injections, 17 recovered, a mortality of 42.5%. One case unimproved by water-injection was cured by subsequent injection of air. Of the 15 cases operated on, 2 recovered, a mortality of 86.6%. As

to the causes of invagination, polyp is mentioned in 3 cases, stricture in 1, foreign body in 1, jarring in 2, enterocolitis in 8, constipation in 1, and coughing in 4. The author then reports a case in a child, 7 months old, in which operation was successfully performed. It is evident that the mortality of cases operated on is greater than that of the cases subjected to mechanical treatment, and so long as operation is reserved for desperate cases and as a final resort the surgeon will not find support for intervention in the study of statistics; but it is perfectly clear that with intervention instituted at once on the first failure of a thorough effort at reduction under an anesthetic, the now high mortality would be lowered. The author believes positively that after injection has failed celiotomy should be immediately performed, disinvagination being effected, if possible; and if it is not possible, Maunsell's operation being performed, the portion of the gut cut away being delivered in some cases through the anus.

Darras¹ has pointed out that **duodenal perforation** from a simple ulceration is most apt to occur in the anterior wall, and is in consequence followed by general peritonitis. It is important to make a diagnosis between perforative peritonitis due to perforation of the gastric ulcer of the appendix and of a duodenal ulcer. The chief points in this distinction are the previous history, the condition under which perforation arose, and the exact situation of the initial trouble. Perforation of the stomach is more common in women than in men; whereas perforation of the duodenum is more common in men than in women, and the latter is more apt to have been latent than the former. In duodenal perforations vomiting is a more constant phenomenon than in gastric perforations. The only proper treatment is to open the abdomen and, if possible, suture the point of perforation; and if this is impossible, pack around it with gauze.

Arthur E. Hertzler² describes a **modification of the Murphy button** devised by himself. The instrument is made to permit us to unite the decal-

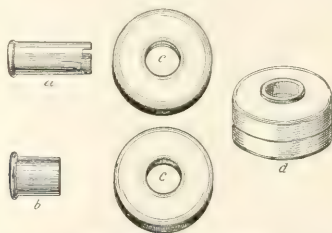


FIG. 7.—a, male portion, showing 4 catches which are adjusted to work in pairs; b, female portion, containing 36 threads to the inch on its inner surface; c, the two decalcified plates separate from the metallic portion; d, the button closed, showing how the central tubes slip into the plates and then shove together, like the Murphy button (Hertzler, in Jour. Am. Med. Assoc.).

cified bone-plates of Senn without the employment of sutures. An exploded cartridge-shell was employed. Little strips were cut down the sides and bent outward to form hooks and catch in threads in the female part of the button. The regular lock of the Murphy button was employed, but this locks only about $\frac{1}{8}$ in., which is not sufficient, so Hertzler used 4 catches upon the male portion of the lock, the two opposite acting together. This permits it to fasten

¹ Gaz. hebdom. de Méd. et de Chir., Aug. 22, 1897.

² Jour. Am. Med. Assoc., May 7, 1898.

over $\frac{1}{10}$ in. with the thread of $\frac{1}{32}$ in. in the female portion of the lock. This does away with the necessity of a spring-plate, as used in the Murphy button. The author used 32-caliber for cats, 38 for small dogs, and 45 for large dogs, for lateral anastomosis and cholecotomies. The bone, when fresh, is cut into circles a little less in diameter than the gut it is intended to unite. Holes are drilled just sufficiently large to admit the tubes. These are made larger and of lighter weight than the central tubes of the Murphy button of the same diameter. The inner side is reamed out about the central part of the opening for the puckered part of the gut to lie in after the draw-suture has been tightened. All edges are now rounded, the discs are decalcified, dried between filter-paper under pressure, and hardened in alcohol. The author has tried ivory, but while it is more easily worked, the time necessary for its absorption is not so constant as that for bone. He concludes that in the end-to-end anastomosis the draw-stitches should be regularly placed, and should not include more than 2 mm. of tissue. In gastroenterostomy a circular piece of tissue the size of the central tube should be cut out of the stomach and the wall of the intestine. In uniting the two parts of the button they must be pressed together very firmly, much tighter than a Lembert suture could be drawn; but the tissue must not be unduly crushed. This method has the following points of merit: The junction is strong and food may be given as soon as desirable. No foreign body remains after union is completed. The body which is to be extruded is extremely small. In gastroenterostomy the button cannot become lodged in the stomach, as the disc becomes digested off first, forcing the remainder into the intestine. Even should the disc in the intestine be the first to become absorbed, after the remaining disc is digested the central tube will pass readily. It can be applied as quickly as any known method. There are no sharp points in contact with the intestinal wall. The opening is large and has little tendency to contract. The method has not as yet been used upon the human subject. [Other modifications of Murphy's button are described on pages 311, 312.]

Halsted¹ has called attention to the use of **inflated rubber cylinders**

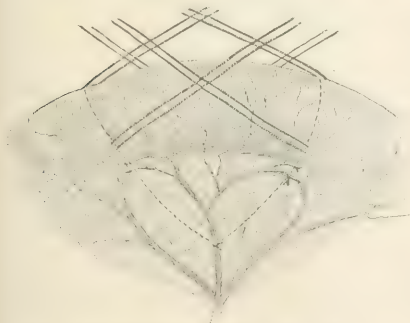


FIG. 8.—Presection-stitches (Halsted, in Phila. Med. Jour.).

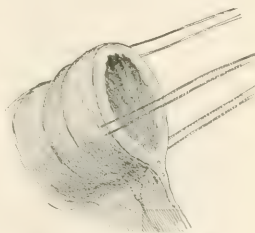


FIG. 9.—Presection-stitches (Halsted, in Phila. Med. Jour.).

for circular suturing of the intestine. The author recalls his observation in 1889, as to the proper method of performing intestinal suturing, in which

¹ Phila. Med. Jour., Jan. 8, 1898.

he showed that the mattress-stitch should be used, and that the suture should be caught in the submucous coat. Halsted says that the objections which can usually be urged against mechanical aids in enterorrhaphy do not exist in regard to the inflatable rubber cylinders. They are employed by the

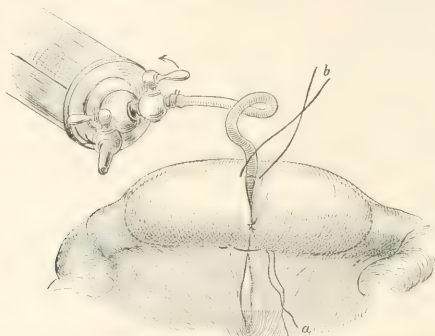


FIG. 10.—The three presection-stitches have been tied. They are supplemented by a fourth stitch, *b*, which is removed later to facilitate withdrawal of the bag (Halsted, in Phila. Med. Jour.).

following method after the intestinal resection. A presection-suture is put on each side of the bowel, above and below the lines where it will be resected. The mesenteric vessels going to the portion to be resected are ligated. The intestine is divided with scissors as close as possible to the presection-stitches. No blood-vessels are occluded by these stitches. Two of the presection-

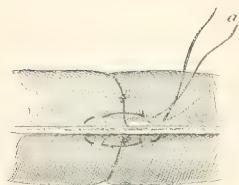


FIG. 11.—The first and most important of the mattress, or permanent stitches (*a*) (Halsted, in Phila. Med. Jour.).

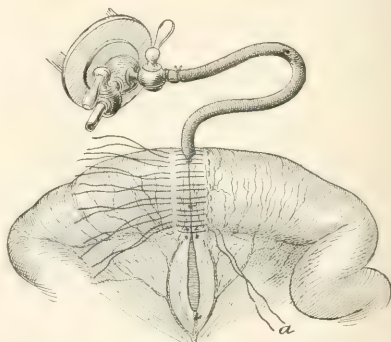


FIG. 12.—The bag is still distended, and all the mattress-stitches have been placed (Halsted, in Phila. Med. Jour.).

sutures are then tied, and a collapsed rubber cylinder is pushed into the bowel by means of forceps. Another presection-suture is tied, and the fourth stitch is added, which can be removed later, when we wish to withdraw the bag. The bag is inflated with air by a syringe. Water could be used, but air is prefer-

able, because a bag distended with air will more quickly reveal a prick from a faulty stitch than will a bag distended with water. The stitch *a* is the first and most important of the mattress- or permanent stitches. This picks up the submucosa 4 times, as by all the mattress-stitches, and the mesentery is twice perforated by it. From 10 to 12 mattress-stitches are introduced in

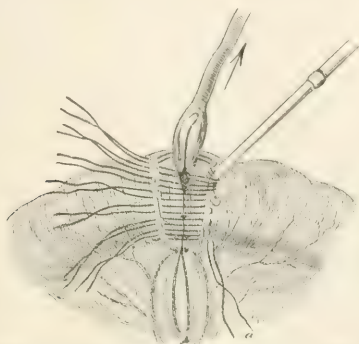


FIG. 13.—Two mattress-stitches drawn aside on a hook: the temporary stitch is removed, and the collapsed bag is being withdrawn (Halsted, in Phila. Med. Jour.).

operations upon human beings. The first stitch to be tied is *a*, and this will infallibly turn into the mesenteric border without occluding a single vessel. In the illustration it will be seen that the stitches on the right side pass under one vessel and over another, without interfering with either, and on the left side a vessel lies uninjured under the stitches. Two mattress-stitches are drawn aside, the temporary stitches removed, and the collapsed bag taken out. The

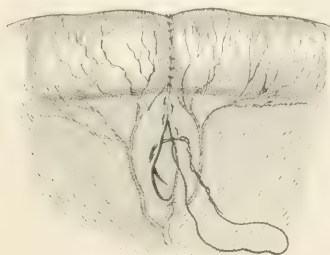


FIG. 14.—The circular suture is completed. The slit in the mesentery is being sewed in such a way that its circulation is not interfered with (Halsted, in Phila. Med. Jour.).

circular suture is completed, and the slit in the mesentery is sutured in such a way that its circulation is not interfered with. Halsted then sets forth the following advantages which he believes to reside in the inflated cylinder: 1. The vermicular action of the bowel is arrested around the bag and the stitches can be placed at regular intervals. 2. The inflated bag spreads out to a fine edge the inverted raw edge of the intestine, the operator thus being enabled to place

stitches with great accuracy at the required distance from the edge. 3. If a small segment of intestine is to be sutured to a larger area, a smaller piece is extended so as to fit the larger piece. 4. The cylinder takes the place of two assistants. 5. It prevents the escape of intestinal contents and does away with the use of clamps or compression-forceps. 6. The operation, exclusive of suture of the abdominal wall, can be performed in 5 or 6 minutes. 7. But little handling of the intestine is necessary, the tube from the bag and the syringe being used as a handle. 8. The operation can be performed readily without a single assistant.

Ernest Laplace¹ has devised a **new forceps** for intestinal anastomosis. He claims that it permits of very rapid and accurate work, without leaving

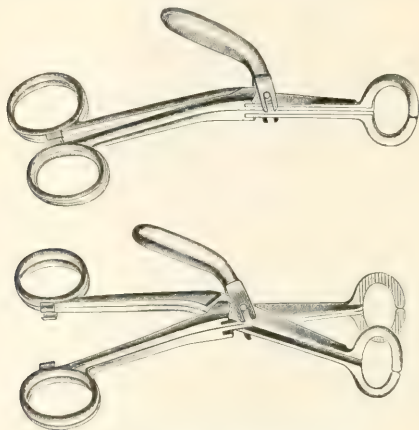


FIG. 15.—Forceps for intestinal anastomosis.

any foreign substance within the gut. It consists of 2 rings, introduced into 2 openings, and approximates and supports the parts during the act of suturing. The rings of the forceps, being separated into 2 pieces, can be gently withdrawn from a small aperture still unsutured, and the anastomosis is completed by adding 1 or 2 sutures. The forceps are brought together laterally and held together by means of a clamp. The ends of these forceps are curved into a half-circle, so that on the lateral approximation of the 2 forceps a ring is formed on the end of the forceps; locking takes place as in ordinary hemostats. There are 5 different sizes of this forceps. In order to perform a lateral anastomosis by means of this instrument, a longitudinal incision is made in each intestine to be approximated. At the center of the incision, right and left, a suture is introduced, uniting the edges to the corresponding spot of the opposite incision. A long end is left to the thread of this suture on each side. By drawing gently on these threads both incisions are transformed into diamond-shaped openings. The forceps, clamped but unlocked, is introduced by inserting 1 ring into each intestinal opening, encircling each diamond-shaped gap. The instrument is then clamped, bringing serous

¹ Phila. Med. Jour., June 11, 1898.

membrane to serous membrane. The sutures are applied circularly about the intestine. The forceps-handles project from the lower end of the opening. By removing the clamp the forceps falls apart in halves. Each half is now

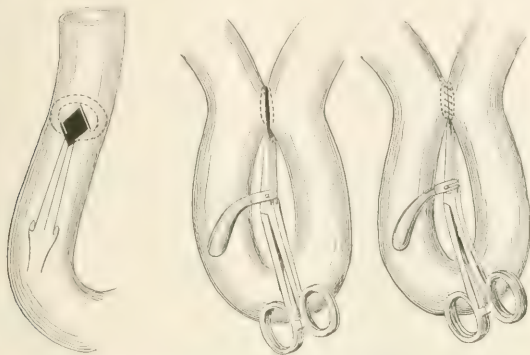
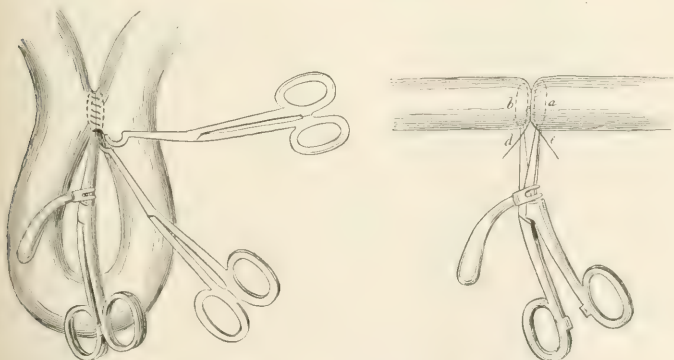


FIG. 16.—Laplace's forceps for intestinal anastomosis (Phila. Med. Jour.).

unlocked, loosening its attachment to the gut within the intestine, and by raising one forcep at a time each half-ring is withdrawn out of the small unsutured opening. The suturing is then complete. This instrument is said greatly to facilitate the performance of end-to-end anastomosis.



FIGS. 17, 18.—Laplace's forceps for intestinal anastomosis (Phila. Med. Jour.).

J. Shelton Horsley¹ has suggested a **new method of intestinal anastomosis**. After the intestine has been resected the mesentery is incised for several inches at right-angles to the intestine, or a V-shaped piece is removed;

¹ N. Y. Polyclinic, Dec. 15, 1897.

the ends of the bowel are then placed side by side, opening in the same direction and being in contact along their free surfaces, opposite the attached mesentery. A pair of artery-forceps inserted in the ends and clamped holds them in this position. A finger of the left hand is inserted into one end and the thumb into the other, and over them, as a bobbin, a Cushing suture of fine silk in an

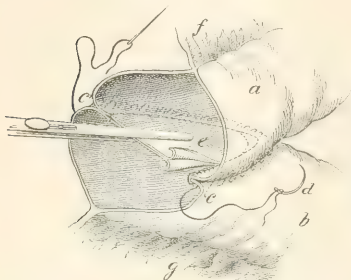


FIG. 19.—The ends of the intestine are in position and grasped by the artery-forceps. The first row of sutures has been partially applied, the septum partly cut away, and the second row of overhand sutures begun. *a, b*, the two ends of the intestine; *c, e*, the first row of sutures (Cushing); *d, f*, the second row of sutures (overhand); *g*, the mesentery; *f* and *g*, the mesentery (Horsley, in N. Y. Polyclinic).

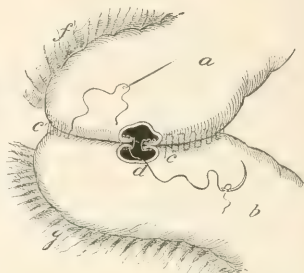


FIG. 20.—The operation nearly completed. The septum has been cut away, and the row of overhand sutures has been brought almost at its point of commencement. The first row of sutures (Cushing) are also shown as they should be continued after the overhand sutures are finished. *a, b*, the ends of the intestine; *c, e*, the first row of sutures (Cushing); *d, f*, the second row of sutures (overhand); *f* and *g*, the mesentery (Horsley, in N. Y. Polyclinic).

ordinary cambric needle is commenced. All the limbs of the intestine are sutured together within the bowel. The suture is then carried obliquely for about 2 in. of the small intestine and carried over the other side; when it reaches a point corresponding to its point of commencement the needle re-

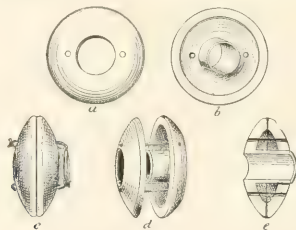


FIG. 21.—Decalcified ivory discs: *d*, stretched apart to show the elastic; *e*, in section (Gill, in Lancet).

mains threaded; the bowel is now partly everted, exposing a U-shaped septum, grasped by the artery-forceps first applied. This septum is cut away with curved scissors, leaving a margin of $\frac{1}{8}$ inch. An overhand suture of silk in a curved needle is then commenced at one edge of the "shelf," made by cutting away the septum, and is carried through all the intestinal coats. When the suture reaches the end of this shelf it is continued by slightly invaginating the rest of the resected ends, which consists of about one-fourth of the entire

circumference. It terminates at its point of commencement. The first line of sutures is now finished by continuing it about $\frac{1}{4}$ in. from the overhand suture.

R. Martin Gill¹ recommends **decalcified ivory-discs** for end-to-end and lateral anastomosis of the intestine. The author maintains that Murphy's button may be retained in the intestine and thus become a source of danger, and that the button causes stenosis at its point of application, because the apparatus is of less circumference than is the bowel. Gill has long been looking for a substance which would serve to join the serous coats, which would be subsequently digested and would not produce stenosis. He finally settled upon decalcified ivory. He constructs a button out of this material which effects approximation on the principle of the Murphy button. The two discs are joined together by thin bands (Fig. 21). The elastic causes moderate pressure to be made upon the tissue caught between the discs, and the moderate pressure causes atrophy rather than gangrene, and no stenosis results.

[Gill has modified the Murphy button, but introduces no new principle. He uses a disc which is larger than the button, and a larger size can be used, because

FIG. 22.

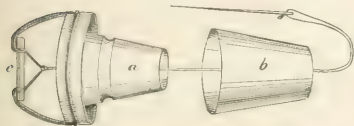


FIG. 24.

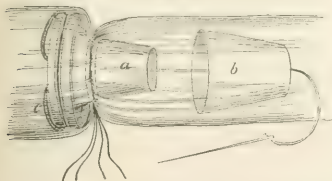


FIG. 23.

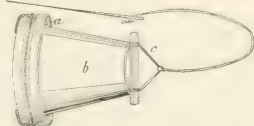
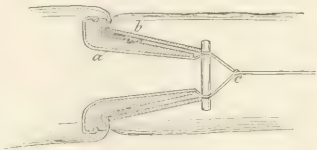


FIG. 25.



Figs. 22-25.—*a*, button with conical, hollow stem and wide undercent flange; on the flange a groove, and another on the stem. *b*, a hollow cone, made to fit loosely over the stem of *a*, and of such length that as it sits in the undercent of the flange its apex projects slightly beyond the apex of *a*. *c*, two short bands of ordinary thread-covered elastic (as used in children's hats), joined in middle by a short, thin ivory bar. The free ends of elastic are tied on either side into the groove on the flange of *a*. A silk thread (No. 12) is fastened to the bar after the manner of a trapeze, and then passed through both cones and threaded on a needle (Maunsell, in West. Med. Rev.).

it separates and digests. The statement that Murphy's button causes gangrene is unjust. If properly applied it causes atrophy, and for this reason is not followed by stenosis. Many surgeons who have been dissatisfied with the button have not given it a fair trial and have not applied it exactly as Murphy directs. Even the idea of a separating and digestible button is not new. The *Med. and Surg. Reporter* of May 22, 1897, contains an article by John S. Miller, in which he describes a modified Murphy button. His button is made of decalcified bone, and small springs and cylinders are inserted inside of the bone cups, the metallic portions being so small as to offer no danger of obstruc-

¹ Lancet, Aug. 28, 1897.

tion, and the button being so large that stenosis cannot follow its use. (See Fig. 26.)

Charles B. Maunsell has devised a **modification of the Murphy button**, which he thinks possesses the advantages of the button and of bone bobbins, without their disadvantages (Figs. 22-25). All parts but the lock are made of decalcified ivory. In order to lock, one cone is placed upon the other, the ivory bar is pushed into the lumen of the cone *a*, and by means of a silk thread is pulled out at the apex of the cone. To use this instrument run

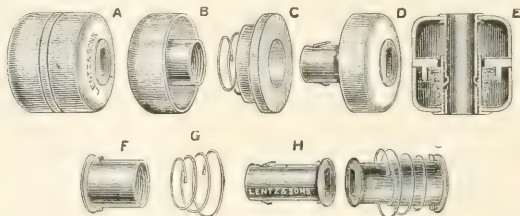


FIG. 26.—Miller's modified Murphy button (Miller, in Med. and Surg. Reporter).

a purse-string suture around each divided end of bowel; pass the needle from without upward $2\frac{1}{2}$ in. from the cut end of the lower segment; place the cone *b* into the lower segment; fasten the purse-string suture into the groove on the stem. Treat the upper segment in the same way. Steady *a* and push *b* until it inverts the intestinal wall of both segments into the flange of *a*, then pull the thread, lock the cones, and cut the thread.

Charles B. Nancrede¹ inquires, What is the best method of **uniting the intestines after total resection?** His conclusions are summed up in the following propositions: 1. End-to-end anastomosis is usually to be preferred to lateral anastomosis. 2. Anastomosis had better be performed without the use of plates, buttons, or bobbins. 3. If any mechanical appliance is employed, it should be partially or wholly absorbable. 4. Extensive and firm adhesions contraindicate the performance of lateral anastomosis. 5. Less free bowel is necessary in the performance of Murphy's operation than in any other method. 6. A metal button should not be used if there is any probability of the existence of adhesions below its point of application. 7. If there are over 4 in. of free bowel, no mechanical aid is necessary. 8. The plan to be followed depends upon the "freedom from adhesion of the intestines, the full patency of the distal portion of the bowel, the facilities at hand, and the condition which calls for the operation." There is no method which is *best* under all circumstances. Nancrede believes that the Ullmann (the Maunsell) method most nearly meets the requirements for an ideal end-to-end junction.

V. Mosetig-Moorhof² discusses the various methods of forming an **artificial anus**. The inguinal operation of Littré he calls colostomy; in this operation the colon is fastened to the abdominal wall, and is opened at once or after some little time, according to the necessities of the case. This operation, however, does not absolutely prevent the passage of feces into the lower part of the bowel. To obviate this objection Madelung introduced the operation of genuine colotomy, the gut being divided across the proximal portion, made to emerge from the wound, and the distal end, after being sutured, placed in the

¹ Physician and Surgeon, Aug., 1897.

² Wien. med. Presse, No. 3, 1898.

abdomen. After this operation has been performed the distal end may become ulcerated from accumulation of feces. König and Sonnenberg, in order to obviate this trouble, left the upper extremity of this portion open and attached to the abdominal wall, below the artificial anus. In order to prevent feces entering into the lower section of the bowel, Verneuil advised the formation of a spur. Both this method and the operation of Madelung require the presence of a long mesocolon and a freely movable colon. The author has devised a method himself. He performs the ordinary operation of colostomy, preceding it by a partial occlusion of the distal portion of the bowel. He effects this partial occlusion by tying a ligature around the bowel and lessening its diameter by about half, sewing together with interrupted sutures the bulging and puckered serous surfaces on either side. When he fastens the bowel to the wall of the abdomen, he sutures the serous and muscular coats of the intestine to the parietal peritoneum, and then passes sutures through both the bowel and the abdominal wall. If this method is found to lead to tension, he fastens the intestine to the fascia of the external oblique, leaving the skin entirely free.

Frederick Treves¹ writes on **idiopathic dilatation of the colon**, and reports a case in which he removed the whole of the bowel of a child below the transverse colon. The child was extremely constipated, the abdomen was distended enormously and was tympanitic, and the distended coil of intestine could be distinctly seen through the thin abdominal wall. The abdomen was opened and a great mass of colon, which looked and felt like an adult stomach, appeared. The wall of the intestine was smooth and hypertrophied. The diameter of the loop was 8 in. An artificial anus was established. Because of difficulty in keeping this anus open, Treves decided to expose the colon from the splenic flexure to the anus. The second operation was performed on October 29. The gut was found much smaller than at the first operation. The colon was practically normal above the splenic flexure. Having noted that the left portion of the transverse colon could be brought to the anus, Treves ligated the left colic artery, and clamped and divided the bowel at the splenic flexure. He sutured the sigmoid and the superior hemorrhoidal arteries and excised the descending colon, the sigmoid flexure, and the upper part of the rectum. The bowel was divided low down in the pelvis, below the entrance of the superior hemorrhoidal artery. The anus, with the remaining portion of the rectum, was removed after the bowel had been divided in the pelvis. The transverse colon was brought to the anus and fastened with sutures. The child recovered rapidly, and was in excellent condition subsequently. Treves says the main dangers of idiopathic dilatation of the colon are these: The colon is enormously distended with gas and is tympanitic. The patient suffers from the mechanical effects of distention, particularly shortness of breath, palpitation of the heart, edema of the legs, and, it may be, with albuminuria. The patient may be entirely unable to move, and the face and extremities may be livid because of the difficulty of breathing. There is marked constipation, and frequently vomiting and hiccough. The term idiopathic dilatation is used to signify that the distention is not due to obstruction. Hence we exclude cases of dilatation of the colon due to volvulus and to impaction of fecal masses or foreign bodies, to the lodgement of concretions, and to the existence of stricture, and cases in which the colon or rectum has been narrowed by the pressure of a tumor external to the bowel-wall. It has long been known that a portion of the alimentary tube may become dilated without obstruction of its lumen. The fact is, obstruction of the lumen of the intestine is not the most rapid means of producing meteorism; tympanites can be

¹ Lancet, Jan. 29, 1898.

produced much more speedily by interference with the innervation and blood-supply of the bowel-wall. In animals, if the chief mesentery vein is ligated, meteorism rapidly follows, and Treves has seen a case due to thrombosis of the superior mesenteric vein. The condition known as ballooning of the rectum is not a state in which the rectum is distended with gas, but is a condition due to paralysis, because if gas is permitted to escape the ballooning remains just the same. It is the muscular wall of the gut which is at fault, and not its contents; but if the patient be anesthetized, the ballooning vanishes. This ballooning is met with in many conditions. It is associated with stricture of the lower portion of the colon, with tumors about the brim of the pelvis, and with conditions which, through pressure, affect the innervation and blood-supply. Idiopathic dilatation of the colon, moderate in extent, may be seen in masked peritonitis. When we turn to a series of clinical cases collected under the title of "idiopathic dilatation of the colon," it becomes evident that we are dealing with conditions much more permanent than the states of distention to which allusion has been made. The cases can be divided into 2 classes: in one series the patients are adults, usually males, and over 50 years of age; in the other series the patients are children, and abdominal trouble has existed from birth. Treves does not discuss in this paper the distention met with in adults. In fact, in adults the cause seems to be usually some sort of obstruction. In young children distention of the colon and obstinate constipation are noticed from birth. The lower section of the colon is chiefly involved; the wall of the dilated bowel has been greatly hypertrophied; movements of the hypertrophied bowel are visible through the abdominal walls; and relief can only be obtained by enemata. Certain secondary conditions, such as catarrh and ulceration of the distended gut, with possible tearing of its walls in extreme cases, have been noted. Of the reported cases, except one in which an artificial anus was made, all ended fatally. The general circumstances of these cases do not seem to be consistent with the idea of an "idiopathic dilatation of the colon." Treves thinks that in these cases there is a distinct congenital narrowing of the lower part of the colon; that there is an actual mechanical obstruction; and that the dilatation of the bowel is secondary, and not in reality idiopathic.

A. C. Panton¹ reports a case of **perforating typhoid ulcer**, with recovery after operation. The patient was convalescent and was sitting on a balcony, when he was suddenly seized with violent pain in "the lower part of right side of the abdomen," and rapidly developed shock and pain appeared over the entire abdomen. In about 4 hours reaction set in. The next morning the abdomen was tender and distended; temperature, 98° F.; pulse, 120. Patient was etherized 21 hours after the seizure. Incision as for removal of the appendix. When the abdomen was opened, it was found to be flooded with thin fecal matter and filled with gas. Intense general peritonitis existed, particularly in the iliocecal region. Appendix normal, except for the general peritoneal inflammation. About 12 in. from the ileocecal valve a perforated ulcer of the ileum was found. The edges of the ulcer were trimmed with scissors, and the opening closed by Lembert sutures of silk reinforced with mattress-suture of silk. The recently healed scar of another ulcer was observed. Abdomen was flushed with 36 gallons of hot salt solution. Pieces of iodoform-gauze were pressed into different portions of the abdomen and the damaged coil of intestine was left close to the abdominal incision, and a piece of iodoform-gauze was laid over the suture-line. Operation lasted an hour. The patient recovered. No cultures were taken from the abdomen at the time

¹ Ann. of Surg., Aug., 1897.

of operation. Panton says this is the twelfth case on record of recovery from operation for perforating typhoid ulcer (46 operations, with 12 recoveries, or 26.3%).

Francis J. Sheppard¹ reports a remarkable case in which he removed an enormous **fibromyoxoma of the mesentery** and 8 feet of intestine, the patient making a complete recovery.

APPENDICITIS.

Duret² read a paper upon the surgical treatment of **retrocecal abscess in appendicitis**. He holds that these abscesses are common (the appendix is posterior to the cecum in one-fifth of all cases). Such an abscess can arise when the appendix is normally placed, the toxic matter having been brought by the veins and lymphatics to the retrocecal region. The incision ordinarily employed to open this form of abscess always opens the peritoneal cavity. Duret employs the following method of operating: After opening the abdomen, separate the cecum from the rest of the abdominal cavity by suturing the parietal peritoneum to the cecum and occluding each end of the wound with iodoform-gauze. The abscess is emptied by the finger at the external edge of the cecum, and the abscess-cavity is scraped, rubbed with gauze, and drained. In some cases a counteropening is made in the loin. Three layers of sutures should be applied to close the abdominal wound. Fred. Kammerer³ has suggested the following **incision for interval-cases** of appendicitis: A vertical cut through the superficial parts to the outer layer of the rectus sheath; retraction of the muscle toward the median line; separation of the posterior surface of the muscle from the posterior layer of the sheath; opening into the abdomen through this posterior layer. In this operation it does no harm to divide the epigastric vessels, but we should avoid cutting the branch of the ileohypogastric nerve, as division of this nerve causes atrophy of a portion of the muscle. The appendix can be easily reached and removed. After removal of the appendix the incision in the peritoneum, transversalis fascia, and posterior layer of the rectus sheath is united by a continuous catgut suture, and the rectus muscle is allowed to fall back into its natural position. The incision in the anterior layer of the sheath is closed by interrupted sutures of catgut, some of which include a portion of the muscle. The skin is sutured with catgut. [This operation will give ready access to the appendix in many cases; but if the appendix is posterior or external, it seems to us that its removal would be very difficult. The danger of dividing the nerve-supply is a decided objection, as the inevitable muscular atrophy must predispose to hernia. A similar operation has been performed by Jalaguier. This surgeon cuts the posterior

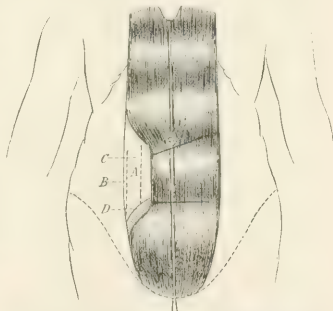


FIG. 27.—A, layer of posterior sheath of rectus, transversalis fascia, and peritoneum; B, incision through the skin; C, incision through posterior sheath of rectus, fascia, and peritoneum; D, semilunar fold of Douglas (Kammerer, in *Ann. of Surg.*).

The incision in the peritoneum, transversalis fascia, and posterior layer of the rectus sheath is united by a continuous catgut suture, and the rectus muscle is allowed to fall back into its natural position. The incision in the anterior layer of the sheath is closed by interrupted sutures of catgut, some of which include a portion of the muscle. The skin is sutured with catgut. [This operation will give ready access to the appendix in many cases; but if the appendix is posterior or external, it seems to us that its removal would be very difficult. The danger of dividing the nerve-supply is a decided objection, as the inevitable muscular atrophy must predispose to hernia. A similar operation has been performed by Jalaguier. This surgeon cuts the posterior

¹ Brit. Med. Jour., Sept. 3, 1897.

² Proc. French Congress of Surgery, Oct., 1897.

³ Ann. of Surg., Aug., 1897.

layer of the sheath more externally than does Kammerer, and thus avoids the epigastric vessels.]

Grinda¹ presented a paper before the International Congress at Moscow, in which he advocated the **lumboiliac incision** in the operation for suppurative appendicitis. The incision should run from the external border of the sacrolumbar muscles forward, about 1 in. above the iliac crest, to within $1\frac{1}{4}$ in. of the iliac spine. The author maintains that this incision should be used if indications point to retrocecal suppuration (tenderness over Petit's triangle, little or no tenderness at McBurney's point, fulness and rigidity in the right flank, clear percussion not over the right iliac fossa). In doubtful cases it is quite proper to make this incision. Grinda says that this incision exposes the appendix by the most direct way; it is far less likely than is the ordinary cut to be followed by infection of the cavity of the peritoneum; when it is used, it is not necessary to dissect portions of the small intestine which are anchored between the cecum and the anterior wall of the belly; the wound drains excellently, and hernia does not tend to follow the operation.

John B. Murphy² writes upon the **operative technic of appendicitis**. His views are as follows: The technic depends upon the pathologic state and the lesions present. The proper time to operate is when the inflammation is limited to the appendix, and an operation performed at this period requires a different technic from that employed when there is an abscess or general peritonitis. If we operate early in a primary case—that is, within the first 24 or 48 hours—the indication is to remove the appendix. Make the incision to the median side of the point of greatest tenderness (the appendix lies at the point of greatest tenderness), whether this point is in the normal situation, up toward the liver, near the margin of the pelvis, or in the rectum. Only a small incision is necessary, and the incision is made after McArthur's plan [McArthur divides the skin so as to avoid cutting the vessels and nerves, and separates the muscles as does McBurney].³ Locate the appendix and surround the field of operation by a coffer-dam of sterile or iodoform-gauze. Separate the adhesions. If an abscess exists, any escaping pus is caught by the gauze. These recent adhesions, though lacerated, will not be infected by pus, because they soon become covered by exudate, which does not permit of absorption. In an older case (7 to 8 days) the adhesions have become vascularized, and when lacerated become absorbing surfaces for septic material. The white longitudinal band at the head of the colon points out the situation of the appendix, and the diverticulum is brought into the wound. If the case is of the acute suppurative variety, it is not altogether safe to remove the appendix by Deaver's method [Deaver's method is amputation close to the head of the colon and closure by Czerny-Lembert sutures]. It is wiser to cut through the coats down to the mucosa, form a cuff and turn it back, ligate the mucosa in the depths of the cuff with catgut, amputate close to the ligature, cauterize the stump with 95% carbolic acid, turn down the cuff over the stump, and tie a catgut ligature around it. Suppose a case which has been in progress for 3 or 4 days, and in which a circumscribed abscess exists within the peritoneal cavity. If the abscess is in the pelvis or near the gall-bladder, make the incision, not over "the highest point of induration, but to the median side of it." In any circumscribed abscess make the incision into the "free peritoneal cavity, never into the induration," if the incision is anterior. If a retrohepatic abscess exists, incise directly over the seat of suppuration and drain posteriorly. If a circumscribed abscess is situated in the right iliac fossa, it can be readily outlined. Make an incision

¹ Méd. mod., No. 71, 1897.

² Chicago Clinical Recorder, Aug., 1897.

³ See YEAR-BOOK for 1897, p. 208.

into the free peritoneal cavity to the median side of the induration and insert the coffer-dam of gauze. Enter the abscess on its outer side by separating adhesions, sponge out pus, do not irrigate, and try to locate the appendix. The appendix can be located by the induration, by the finger entering the rupture, or by feeling calculi. If possible, it should be removed; but if the appendix is firmly held in a mass of vascularized adhesions, the appendix should be left for a time, and the abscess drained and the peritoneum protected. If the appendix is left, recurrent attacks are liable to occur. If a recurrent attack does occur, the appendix should be removed soon after it commences. What operation is demanded when there is free pus in the peritoneal cavity? Multiple drainage with gauze, or tubes associated with gauze, is employed, gauze being passed into the pelvis, into the neighborhood of the right kidney, and in various other directions. Irrigation is not desirable. The coffer-dam of gauze is allowed to remain from 6 to 10 days in pus-cases. In cases of appendicitis which are drained provisional sutures are introduced.

John B. Deaver¹ writes upon some **points in the technic of the operation for appendicitis**. Complete anesthesia is to be obtained, as thorough relaxation is necessary. Complete anesthesia is especially necessary if gauze-packing is employed to protect the general peritoneal cavity, because if the patient is but partly anesthetized, portions of intestine or omentum may be forced between or around the gauze. The nature of the incision depends upon the case and the preference of the surgeon. In some cases Deaver uses the incision parallel with the semilunar line; in other cases the incision which runs obliquely between the anterior superior iliac spine and the semilunar line. The incision by the side of the semilunar line is used when only a small incision is necessary. In chronic cases, with few adhesions, the appendix may be removed through an incision which will admit only the index-finger. A pus-case, or a case with many adhesions, requires a much larger incision. If he uses a buried suture to close the wound, he employs silver. The author rarely advises the use of an abdominal support after healing of the wound. He affirms that those who advocate leaving the appendix "belong to the class of surgeons whose experience is limited in this kind of work." The appendix should be removed in "the vast majority of cases." We may believe an appendix is shut off from the abdominal cavity when it is not. It is "incomplete and dangerous" surgery to leave an infected appendix within the abdomen, because this structure may lead to trouble in the future (recurrent collections, lymphatic absorption, septic phlebitis, intestinal obstruction, fecal fistula, etc.). Deaver cautions the "occasional operator" and the man not practically familiar with belly-work against radical appendiceal work. The appendix should be excised completely, being cut out of the cecum with a pair of curved scissors, and the wound in the cecum being closed. To embed the base of a diseased appendix into the wall of the cecum infects the wall and may lead to abscess. Gangrene of the caput coli may be met with in severe appendicitis. A patch of gangrene should be excised and the opening sutured. If the entire head of the cecum is involved, it is far safer to wall off the cecum from the general peritoneal cavity, allow nature to dispose of the necrotic tissue, and later, if necessary, close the resulting fecal fistula. Pus-cases must be drained. In the majority of cases one or more pieces of iodoform-gauze are used. If the abscess occupies the pelvis, a glass tube is used with the gauze. The author has never had occasion to regret the use of iodoform-gauze. The wound is sutured by the interrupted or buried suture, except when the muscles have been

¹ Ann. of Surg., Jan., 1898.

split, in which cases layers of continuous catgut suture are used. Deaver is more than ever convinced of the propriety of operating in acute appendicitis as soon as the diagnosis is made, if this is done within a few hours of the onset of the first pain. [We do not consider it fair for an author to assert that all who disagree with him do so because of lack of experience. Many surgeons of large experience—in fact, most surgeons—do not believe that the appendix should be removed in every case, and do not operate on every case. Deaver says if the entire head of the cecum is involved, wall it off with gauze, and wait for nature to dispose of the necrotic tissue. And yet he states previously that it is “incomplete” surgery to leave an appendix. He objects to leaving even an appendix, because it may lead to future attacks; but he does not object to leaving the gangrenous colon, although it may lead to a fecal fistula. He leaves a gangrenous colon, and we think properly leaves it, because of the danger of removing it, and in some cases, for exactly the same reason surgeons leave the appendix. The question in such a case is one of safety and not of completeness.]

Schuchardt¹ reports the case of a man of 22, who was seized with pain in the right iliac region. After a time a large mass developed in that region, the patient suffered from fever, and the tumor fluctuated. It was assumed that he had appendicitis, and the abdomen was opened. The appendix could not be seen, but a cavity the size of a walnut was discovered, which was lined with tuberculous granulations. The wound did not completely heal, a fistula being left, and some months later another operation was performed. The appendix was discovered to be adherent to the small intestine, and to have **perforated into the intestine**, the mucous membrane at this spot being tuberculous. A portion of the intestine was removed with the appendix, the intestinal opening being sutured. The patient recovered.

Kölliker² writes upon the **differential diagnosis** between appendicitis and obstruction of the intestine from gall-stone. The case which he reports, he says, resembles one of appendicitis described by Sonnenberg. The woman was 58 years of age, and there was no history of a previous attack of biliary colic. A few months before, she had had an attack of appendicitis. Three days before Kölliker saw her she became constipated, and in 24 hours fecal vomiting arose and a tumor could be felt in the ileocecal region. Various diagnoses were made by observers, one being compression of the bowel from an old perityphlitic exudate. There were no symptoms of trouble in the biliary passages, and Kölliker decided that the case was one of appendiceal exudate causing compression of the bowel. The abdomen was opened in the middle line. A hard body, filling the lumen of the bowel, was found; the bowel was opened and a gall-stone extracted. The wound was sutured and the patient recovered. Kölliker says that in these cases it is extremely difficult to make a diagnosis before the abdomen has been opened; but that in gall-stone obstruction the tumor is more movable than in appendicitis and there is an acute and nonfebrile onset.

Hermann Kümmell³ presents a clinical and pathologic study of 104 cases of **recurring appendicitis** in which operation between attacks was performed. There was not a death in this series. Examination of the appendices which had been removed showed that in not one case had the organ become normal after the attack. Every specimen showed inflammatory conditions. These changes arise from catarrh of the large bowel, and act as the basis for the progress of the disease—that is, the formation of conerctions,

¹ Berlin. klin. Woch., No. 41, 1897.

² Centralbl. f. Chir., Oct. 28, 1897.

³ Berlin. klin. Woch., Apr. 11, 1898.

with subsequent ulceration of the appendix, perforating ulcer, and acute inflammatory changes in the appendix. The author says that clinical symptoms are not certain, and that we cannot positively determine from them the stage which the inflammation has reached or the variety to which it belongs. For instance, a perforative appendicitis may have distinctly mild symptoms in the beginning, and in the ordinary chronic inflammation there may be very high fever and persistent vomiting. The author says that, pathologically, these cases should be divided into 5 groups: 1. Those in which the appendix is in a state of chronic inflammation; 2. In addition, those in which there are ulcers and stricture-formation; 3. Those in which there are ulcers and perforation; 4. Those in which there are concretions; 5. Those in which the appendix is extensively destroyed. He calls attention to the important fact that symptoms of diffuse peritonitis may be present when there is an absolutely localized appendicular process, and he believes that many of the reported recoveries from operation are really of this nature. In cases of chronic appendicitis the patient never becomes absolutely healthy between the attacks; and the constant discomfort, attacks of pain, and progressive lessening of strength justify and, in fact, demand operative interference. It is often difficult to make a diagnosis between acute appendicitis and obstruction of the bowel. In intestinal obstruction it is usually possible to make out above the obstruction loops of distended bowel which are undergoing active peristalsis. A chronic appendicitis must be distinguished from ovarian disease, floating kidney, and disease of the gall-bladder and of the stomach. He divides his cases for therapeutic purposes into 3 groups. In the first group there is an acute onset; severe peritoneal symptoms exist, and immediate operation must be performed. In the second group he places moderately severe cases; in these medical treatment may be instituted, including opium; if the symptoms do not rapidly improve, or, if after they improve they again return, operation must be performed. In the third group the cases get well, but relapse; and in this form, when there have been numerous recurrences, operation should be performed.

Lop¹ reports a case of **suppurative typhlitis** in which the appendix was normal. In this case the cecum was perforated at its outer border. An artificial anus was established 6 weeks after this period, and operation was performed for the relief of stricture of the intestine near the old incision, and the patient died as a result. The appendix in this case was absolutely normal.

Richelot² reports a case to prove that appendicular **symptoms** may be present **in the absence of a diseased appendix**. This surgeon operated in a case in which the uterine adnexa were diseased. At a later period he found it necessary to perform vaginal hysterectomy. Some 3 years after this latter operation the woman had evidences of appendicitis, and the appendix was removed. It was long, slightly diseased, thick, and contained concretions. About a year and a half after the removal of the appendix the patient complained of persistent pain in the iliac fossa, and at times suffered from nausea and distention of the abdomen. In the right iliac fossa the surgeon felt an indurated, vertically placed mass which was the seat of pain. It felt like an appendix, but the appendix had been removed. He opened the abdomen and found the cecum very adherent; the mass which he had felt through the anterior wall was a band of longitudinal muscular fibers of the intestine, stretched because of the adhesions. The adhesions were loosened and the woman freed from pain. Richelot says that this case, in common with others which have been reported, proves that after the appendix has been removed pain, simulating

¹ Rev. de Méd., Aug., 1897.

² N. Y. Med. Jour., Mar. 12, 1898.

appendicitis may exist ; and that in such a case surgical operation for the separation of adhesions may cure the patient. We should, however, be sure that the symptoms are not the result of nervousness on the part of the patient.

F. A. Southam¹ delivered a clinical lecture upon perityphlitic abscess of the cecal region. He says that it is well recognized that in most cases of abscess about the cecum or appendix the condition has arisen from disease of the appendix ; but he insists that we sometimes meet with suppuration in this situation where the primary lesion is in the cecum, the appendix being perfectly healthy. He reports a case of perityphlitic abscess due to perforation of the cecum by a pin. Operation was performed, a fecal concretion, ovoid in shape, was taken away, the abscess was washed out, and the patient recovered. It is interesting to note, in connection with this case, that Hawkins has said that perforating ulceration of the cecum, though it does occasionally occur, is so very rare that it may be disregarded. Treves has said that in rare instances a cecal perforation occurs. This very rarely is primary, the mischief starting in the wall of the cecum, the appendix itself being sound ; but in the great majority of instances the perforation is secondary, and is due to an appendicular abscess having made its way into the cecum, the perforation having taken place from without. Bull has analyzed 57 cases of appendicular abscess in which the surgeon did not evacuate the pus ; he found that in 15 cases, or 26 %, it burst into the cecum. Southam reports a case of perityphlitic abscess due to perforation of the cecum ; fecal fistula ensued, an ileocolostomy was performed, and the patient recovered. The appendix was perfectly healthy. There was an absence of assignable cause for this perforation, and it is not improbable that the lesion was produced in the same manner as in Case I. We know that in the large intestine stercoral ulcers are not rare—that is, ulcers due to irritation and pressure of masses of impacted feces—and that perityphlitic abscesses may result ; though it is somewhat unusual for stercoral ulceration to go on to perforation unless the fecal impaction is secondary to obstruction of the bowel lower down ; yet this can occur in a case of simple chronic constipation where the accumulation of feces is due to loss of tone in the walls of the bowel. Southam reports a case of this sort in which there was perityphlitic abscess due to stercoral ulceration and perforation of the cecum. Extravasation took place into the peritoneal cavity and death ensued.

HERNIA.

Joseph C. Bloodgood² writes on **transplantation of the rectus muscle** in certain cases of inguinal hernia in which the conjoined tendon is obliterated. The term "obliterated" is employed because this condition is more apt to be acquired than congenital, although the conjoined tendon may congenitally be very thin. The important point to recognize at the operation is that the conjoined tendon has either disappeared or is narrow and attenuated ; that Hesselbach's triangle has thus lost its strongest support ; and that the transplanted rectus muscle must be substituted for this defect, in order to make the operation of hernia a radical cure. In cases in which the conjoined tendon is obliterated, if the index-finger invaginates the scrotum, it can be carried through the external ring, and the finger can be readily passed, without meeting any obstruction, into the abdominal cavity. When in this position the finger feels toward the median line of the body the shaft of the rectus muscle ; by curving the finger downward and backward the posterior surface of the symphysis pubis can be readily palpated. In some cases 2 or more fingers can

¹ Brit. Med. Jour., Apr. 30, 1898.

² Bull. Johns Hopkins Hosp., May, 1898.

be introduced into the opening. At the operation, after the division of the aponeurosis of the external oblique, the entire hand can usually be carried into the abdominal cavity. In such cases the conjoined tendon is thinned and relaxed, or entirely obliterated, and the posterior wall of the inguinal canal, from the outer border of the rectus, upward and outward to the internal oblique muscle, and downward and outward to Poupart's and Gimbernat's ligaments, is formed only of transversalis fascia and areolar tissue. The author performs a modification of Halsted's operation in these cases. After the sac has been excised, the peritoneal cavity is closed and the internal oblique muscle is divided, and the rectus exposed and transplanted. At this stage of the operation the deep sutures are inserted. The transplanted rectus muscle is included by the deep sutures. The rectus fills the lower angle of the wound and strengthens the entire wound up to the position of the transplanted cord. [It is certain that the conjoined tendon plays an important part in strengthening the abdominal wall, and Bloodgood's plan of operation to compensate for loss of support from this structure is a valuable addition to our resources. In a direct hernia the conjoined tendon is thinned and bulges. Aston Key has noted that in these cases the transversalis fascia and conjoined tendon cover the sac, and may be blended together. A direct hernia passing through a gap in the conjoined tendon and transversalis fascia must be excessively rare, although Hesselbach encountered such a condition, and describes it as the rule.]

Frölich¹ writes on the **radical cure of hernia in nurslings**. In most children under 2 years of age a hernia can be cured by the use of a bandage, but after 2 years of age a radical cure must be obtained by an operation. If during the first 2 years of life the hernia increases in spite of the use of a bandage, the operation should be performed. At this early age the mortality is about 4%, and 6% of the cases relapse. He neither opens nor removes the sac, but sutures the abdominal wall to the neck of the sac. [In children elaborate operation is rarely necessary. An operation which in an adult would prove entirely insufficient, in a child is apt to be a success.]

Archibald Cuff² reports a case of **strangulated hernia in an infant**, 5 months old. It was a left inguinal hernia, and had been strangulated for 36 hours. The child was placed on a hot-water pillow, chloroform administered, and an incision made clear of the scrotum; the strangulation, which was at the internal ring, was divided, and the sac isolated, twisted, and sutured; the patient made an excellent recovery. [In children it is almost always possible to reduce a strangulation. Cuff's case is of great interest, because it belonged to the rare group in which operation becomes necessary.] Berkeley G. A. Moynihan³ reports a case of **strangulated hernia successfully operated upon in a child, 22 days old**; he also considers the general subject of strangulated hernia in infancy. He tells us that a strangulated hernia requiring operation rarely occurs in infancy. [Carl Stern wrote upon this subject in the *Centralbl. f. Chir.*, in 1894. He collected the records of hospitals in which, in a given period of time, 139,000 children had been treated, and there was not a record of any case of herniotomy for strangulation. In 1900 cases of operation for strangulated hernia operated on in various hospitals, only 13 were children. The proportion of cases of strangulation among adults, as compared with children, is 108 to 1. Turiel, of Paris, who wrote upon this subject, says that many eminent surgeons have never met with acute cases requiring herniotomy. Turiel collected 128 cases. König states that in his entire career he has met with but 2 cases requiring

¹ Rev. de Chir., No. 11., 1897, Supplement.

² Brit. Med. Jour., Sept. 25, 1897.

³ Lancet, Sept. 16, 1897.

operation in the early years of childhood. Nussbaum operated upon 2 cases. Broca met with 9 cases. On considering all the statistics, we find that operations are more frequently called for during the earlier months of childhood than during the later; the greatest number occurred during the first 2 or 3 months of life. Howard Marsh investigated the cause of strangulation in 32 cases: in 20 it was in the neck of the sac, in 7 at the external ring, in 3 at the internal ring, in 1 at both rings, and in 1 at the conjoined tendon. The treatment of strangulated hernia in infancy does not differ from the treatment of the same condition in adults, and a radical operation should always be performed if the condition of the patient justifies it after herniotomy. The mortality of the operation during the first 4 years of life is less than the average mortality of later years. Coley operated upon 5 cases in infants under 1 year. Radical cure was performed in all cases. One case died, the child having been practically moribund at the period of operation. The case reported by Moynihan was a male, 22 days old. Since birth the rupture had been noticed on the right side. Twenty-four hours from the time the surgeon saw him the rupture came down during an attack of crying. The mother was unable to reduce it. Within an hour the child vomited, and continued to do so at intervals. For 12 hours no urine had passed. The hernia was very tense and about the size of a billiard-ball. Attempt at reduction failed, and an operation was at once performed under chloroform. The hernia was found to be congenital; the sac contained a little fluid and 10 or 12 in. of discolored small intestine. The strangulated portion was at the neck of the sac. The rings were stretched with the fingers, the gut returned, and a radical cure performed by Ball's method. The patient made a speedy recovery.]

Broca¹ writes upon **inguinal hernia in children**. He maintains that the term congenital hernia should be employed to designate cases in which the hernia is found in this condition at birth, as is sometimes the case in umbilical hernia. In the vast majority of cases inguinal hernia is not properly congenital. The serous canal between the peritoneal cavity and the cavity of the vaginal tunic is open, and a little mass, which gurgles when replaced, appears soon after birth. The use of a bandage will generally cure such a condition. Weakness of the abdominal walls is a strong factor in the production of hernia. Broca does not attach much importance to the aponeurosis, but considers that weakening of the muscular tissues, such as results from rickets, is an influential cause. If a bandage will not cure such, a hernia-operation should be performed. Broca has operated upon 150 cases under 2 years of age, and has had 3 deaths, 2 of them from bronchopneumonia. William B. Coley² writes upon operations for hernia in children under 14 years of age. In 300 operations there has been but 1 death, and that was due to pneumonia. He has performed 7 operations on children under 2 years of age, with 1 death, the patient being moribund when operated on. In 4 of these 7 cases the cecum was discovered in the sac. Coley says that strangulation in infants is more common than is generally believed, and is not unusually due to the unfortunate advice to make no attempt to wear a truss until reaching the age of 1 year. If the hernia in an infant becomes strangulated, very gentle taxis should be tried for a minute or two; and if this fails, hot cloths should be applied for 15 or 20 minutes, chloroform given, and taxis again employed. If taxis fails, operation should be at once performed, and in most cases a radical cure can be made.

John H. Gibbon³ writes on **cecal hernia**, with the classification of 63

¹ Sem. m  d., Mar. 9, 1898.

² Arch. of Pediatrics, Apr., 1898.

³ Jour. Am. Med. Assoc., June 11, 1898.

cases. The condition is more frequent than is usually supposed. Coley reports 16 cases of hernia of the appendix or cecum in 351 operations for femoral and inguinal hernia. This form of hernia is most likely to be found in early childhood, although Treves has asserted that it is practically limited to adults. In Coley's 16 cases of cecal hernia, only 1 was in a patient over 15 years of age. Halsted, in 291 operations for inguinal hernia, has met with the cecum in 5 cases, and in only 2 of these was the patient over 15 years of age. Of the 63 cases collected by Gibbon, 33 were in patients under 15 years of age; 5 between 15 and 40, 7 between 40 and 50, and 15 in individuals over 50. The condition is rare in women. The cecum is most likely to be found in the right inguinal hernia, next in the right femoral, then in the left inguinal, and, finally, in the left femoral. When occurring in adults the condition has usually been acquired; while in children it is usually congenital. Gibbon then discusses the theory as to the formation of such hernia. In this list of cases 28 were strangulated, 12 reducible, 11 irreducible, and 2 incarcerated. In this class of hernia adhesions between the contents and the sac are more frequent than in other kinds. Gibbon was surprised to find the small proportion of diseased appendices in this condition. Bajardi says that the appendix is diseased in 30% of these cases, which is much larger than in this series. Inflammation of the appendix has occurred in those cases in which it was alone in the sac, there being only 1 exception to this in the list of cases. A remarkable case is that of Broca, who found in the hernia of the right side a loop of colon, and in the left the sigmoid flexure, cecum, and several inches of ascending colon and ileum. The diagnosis of cecal hernia is rarely made before the sac is opened, except perhaps in children and old people, in whom the thin wall permits of palpation of the appendix. In several cases in children Coley has made the diagnosis before operating. In nearly all cases where the cecum is in the sac the appendix is large, and when the appendix alone is present there are usually pain and tenderness. If the diagnosis of this condition is made early, operation should be advised because of the tendency to disease of the appendix.

Duplay and Cazin,¹ in discussing **operations for inguinal hernia**, state that they no longer use buried sutures in performing a radical cure, but use temporary silver wires. The deeper row of U-shaped stitches approximate the deep tissues and make the bed for the spermatic cord. The ends of the wires are twisted over a piece of gauze, and when coaptation is obtained the cord is replaced and wire stitches passed through the superficial tissues, to make the anterior wall of the canal, the skin being sutured at the same time with very fine wire. The superficial stitches are removed on the eighth day. The deeper row is not disturbed for 12 or 15 days, and is then removed.

Lannelongue and Demars² employ **injections of zinc chlorid** in the treatment of inguinal hernia. The strength of the injection is 10%. A hypodermic syringe of good capacity is used, and a long needle is placed upon it. The patient is given ether. Twelve drops of zinc chlorid are thrown into the hernial canal, the internal ring being kept occluded by the pressure of the assistant's fingers, and the spermatic cord being held out of the way at the same time. The needle is inserted through the external ring and is carried well into the inguinal canal; as the needle is being withdrawn the fluid is made to emerge so as to bring it in contact with a wide surface of the canal. A compress is applied and the patient is kept in bed for 10 days, and should afterward wear a truss for some time. The operation causes considerable pain, and, therefore, should be done while the patient is anesthetized. In young

¹ Sem. méd., Dec. 22, 1897.

² Centralbl. f. Chir., Aug. 28, 1897.

people they report cases and record cures. Femoral hernia can be treated by the same method. [Lannelongue's theory is that the irritant fluid will cause fibrous adhesions to form, and he claims to have cured many cases. The operation may succeed in a small hernia, where the canal is still oblique; but will fail in a large hernia, in which the obliquity of the canal is lost. Weir claims that even in a large hernia an injection of irritant fluid will contract the aperture considerably and permit of a truss being readily worn. The operation is, in reality, a revival of Heaton's method; but Heaton used a fluid extract of white-oak bark. The subject was ably reviewed editorially in the *N. Y. Med. Jour.*, Aug. 12, 1897.]

Nélaton and Ombredanne¹ have devised a **new method of radical cure**. An incision which divides the anterior wall of the sac is made, the hernia is reduced, the sac is ligated and cut away, the spermatic cord is loosened from adhesions and from the cremaster, and the posterior wall of the canal is divided from the upper border of the pubis to the internal abdominal ring. By means of a punch a button of bone the size of a centime is removed from the os pubis, about $\frac{1}{2}$ in. below the superior surface. A chain-saw is carried through this opening, and at the inner edge the roof of bone is divided and the bridge is lifted by means of powerful forceps, the periosteal hinge at the outer side being left intact. The cord is placed in this opening of the pubic bone, the roof is dropped in place and sutured by means of catgut, and the deeper layer of the abdominal wall is sutured with a continuous suture passing from the conjoined tendon to Poupart's ligament. With the same form of suture the superficial layer is closed from below upward. They do not think injurious pressure will be exercised upon the cord; but if it is, varicocele and edema of the cord will be observed. If signs of pressure are noted, the wound should be opened, the roof of the osseous canal lifted, the floor of the bony canal cut out, and the cord dropped below the pubic bone.

Frank A. Stahl² writes upon **acute partial enterocele**. He asserts that this condition does occur, and that the symptoms of it are less pronounced than are those of a complete enterocele. For instance, if a partial enterocele is strangulated, the vomiting is not stercoraceous and constipation is not complete. In fact, in some cases the mildness of the symptoms, the smallness of the hernia, and its tendency to disappear prevent the condition being recognized. The diagnosis must be carefully made from enlargement of an inguinal gland and from suppurating conditions about the groin. If an acute partial enterocele is not relieved, it will be followed by the usual changes of an acute hernia, or will be gradually converted into the chronic form of partial enterocele. Its treatment is reduction by taxis or herniotomy.

Barozzi³ presents a study of **hernial tuberculosis**. There are 22 cases upon record, and in these the diagnosis was only made when operation had been performed. There may be practically no symptoms of this condition; but there are usually functional disturbances, considerable pain, and marked edema. As a rule, there is a large fluid effusion, a thick sac, and various points of induration. If the condition is left to itself, it will end fatally. The author maintains that celiotomy should be performed, especially when bacteria have invaded the peritoneum beyond the hernial area. König believes that these circumscribed lesions have a tendency to spontaneous recovery. Jonnesco advocates operation. Sternberg⁴ reports a case of tuberculosis of the hernial sac occurring in a young woman. The case indicates that tuberculosis of the hernial sac is not of necessity linked with general

¹ Presse méd., July 31, 1897.

² Jour. de Méd. et de Chir., Oct. 25, 1897.

³ Jour. Am. Med. Assoc., Oct. 2, 1897.

⁴ Wien. klin. Woch., Mar. 3, 1898.

tuberculosis of the peritoneum. The tuberculosis in this case followed an attack of tuberculous pleurisy. In most instances the source of the infection has been near by, usually the genital organs or the mesenteric glands. An operation for radical cure was decided on, and when the sac was reached it was found to contain miliary tubercles. A short time after the operation general tuberculosis of the peritoneum arose as a secondary consequence of disease of the sac. This patient recovered, thus showing again the effects of the operation *per se* upon tuberculous conditions of the peritoneum.

George Ryerson Fowler¹ describes a **new method for the radical cure of inguinal hernia**. The author maintains that the methods of Barsini, Postempski, and Halsted are not perfect. In the operations of Barsini and Postempski the neck of the sac is ligated at the internal ring, and the funnel-shaped dimple of the peritoneum, which predisposes to hernia, is not corrected. Fowler came to the conclusion that the cord must be transplaced

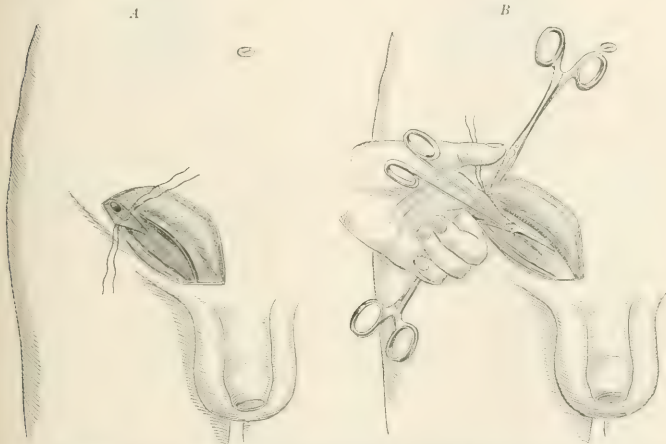


FIG. 28.—A, hernial sac cut away, transversalis fascia opened, exposing deep epigastric vessels, ligated in two places. B, incision of posterior wall of inguinal canal (Fowler, in Ann. of Surg.).

and the internal ring and canal entirely obliterated, in order to insure a cure of the hernia. In order to accomplish this, he displaces the cord posteriorly instead of anteriorly. Fowler's operation not only obliterates the internal ring and the canal, but allows the surgeon to correct the relaxation of the transversalis fascia. The operation is described as follows: The patient is placed in the Trendelenburg position. An incision is begun at the spine of the pubis, is taken outward for 1 in. parallel with the pubic bone, and is then taken obliquely outward and upward in the direction of Poupart's ligament, until it reaches the level of the internal ring (Fig. 28). The incision is carried down to the aponeurosis of the external oblique, and the flap is reflected (Fig. 29). The anterior wall of the canal is incised up to the level of the internal ring. The cord and sac, as one, are separated from adjacent structures, and are then separated from each other (Fig. 30). The sac is opened, the contents

¹ Ann. of Surg., Nov., 1897.

are reduced, and the sac is divided on a level with the muscular wall of the abdomen, and the cut edges of the sac are grasped by forceps. The cord is held out of the way, and the epigastric vessels are sought for and exposed; both the artery and the vein are ligated in two places and divided between the

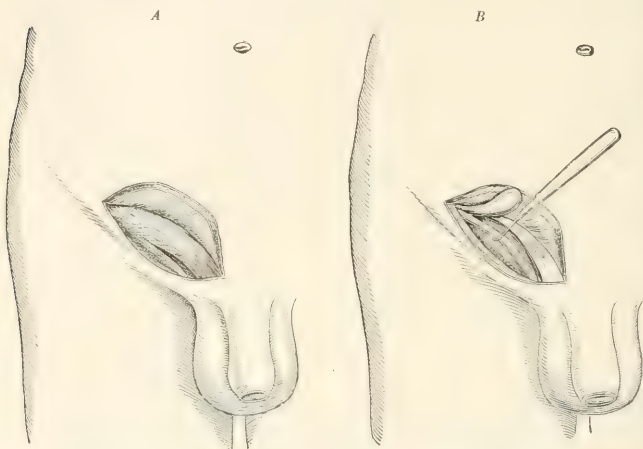


FIG. 29.—*A*, flap turned back, showing aponeurosis of external oblique, external ring, and cord as it passes over pubic bone. *B*, inguinal canal opened up from external to internal ring, showing hernial sac and cord isolated (Fowler, in Ann. of Surg.).

ligatures (Fig. 30). The index-finger is introduced into the abdomen as a guide, and the posterior wall of the canal is divided (Fig. 28). The spermatic cord is placed in the peritoneal cavity. The edges of the opening are drawn

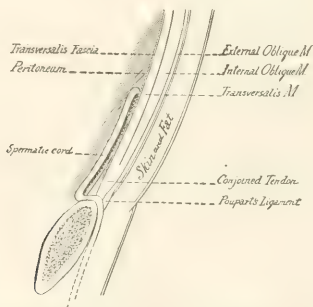


FIG. 30.—Showing new position of the cord (Fowler, in Ann. of Surg.).

forward, in order to afford tissue for a broad serous approximation. Through-and-through sutures are passed from side to side, in order to restore the posterior wall of the canal. These will correct relaxation of the transversalis

fascia. Suturing is begun at the upper angle of the wound. Leave an opening in the lower angle for emergence of the cord, which opening must be low enough to force the cord to curve upward and forward as it makes its exit from the new external ring. The inguinal canal and the gap in the aponeurosis of the external oblique are now closed.

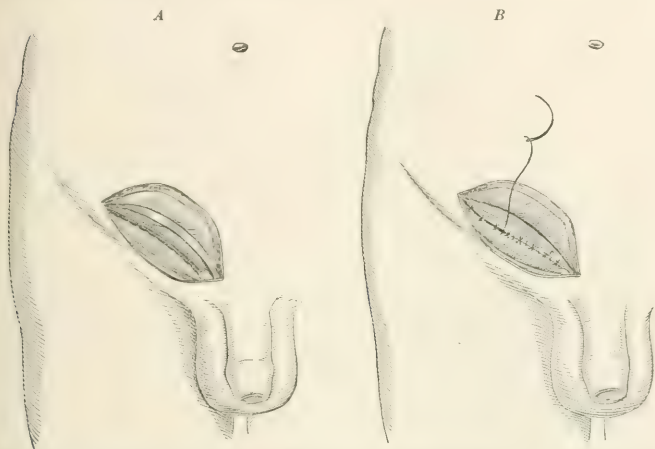


FIG. 31.—A, posterior wall of inguinal canal restored. B, obliteration of inguinal canal (Fowler, in *Ann. of Surg.*).

Alexis Thomson¹ calls attention to the fact that stricture of the intestine may be a sequel of strangulated hernia. He reports a case of interest in which he operated for strangulated congenital inguinal hernia. The patient seemed to be making a complete recovery, but toward the end of the third week symptoms of obstruction arose whenever he took solid food. Twelve weeks after the herniotomy he was in the last stages of obstruction. Laparotomy was performed, a stricture was discovered at either end of a loop of intestine, and the bowel between the two constrictions was covered with connective tissue and fibrous nodules. The damaged bowel was brought out through the incision and sutured in place. The following day the bowel was opened above the suture, and a small Paul's tube was inserted and kept in place by a purse-string suture. Between 2 and 3 weeks after the laparotomy the loop of intestine was resected, end-to-end approximation was effected by means of a Murphy button, and the abdominal wound was closed. This patient recovered completely. The button was passed on the fifty-first day. [Two similar cases have been recorded, one by Garré,² of Tübingen, and one by Maas,³ of Berlin. Many agree with Garré that this form of stenosis is due to exfoliation of necrosed mucous membrane. Garré made a series of experiments, in which he showed that when venous return above was impeded stricture did not result; but if the arterial circulation was interfered with, necrosis of the mucosa occurred and stenosis resulted. He concluded that stricture rarely follows

¹ Brit. Med. Jour., Oct. 9, 1897.

² Beiträge z. klin. Chir., vol. ix., 1892.

³ Deutsch. med. Woch., 1, 1895.

strangulated hernia, because completely ischemia is unusual, and when it does occur gangrene usually results.]

John B. Deaver¹ writes an article with the title of "a **modified operation** for the radical cure of inguinal hernia." He thinks that the operations of Halsted and Bassini are defective in some particulars, recurrence tending to appear after them at the upper end of the canal—that is, at the situation of the internal ring. In the normal condition the peritoneum at the site of the so-called internal abdominal ring presents the conspicuous depression known as the external inguinal fossa, and this is the point where recurrence first shows. In other words, this is the weak point in the canal. It has occurred to him that as much, if not more, attention to the technic for the radical cure should be directed to this part. In both the Bassini and Halsted operations much stress is laid upon obliteration of the inguinal canal and in making a new route for the cord. He is of opinion this is important; but not more so than to get rid of the hernial fossa, which is done by neither of the operative procedures alluded to. He suggests that the sac should be puckered up and carried within the abdominal cavity, after the manner of Macewen, anchoring it at the site of the internal ring, and this can be carried out with much greater accuracy when the inguinal canal is laid open. The operation, as performed by Deaver, consists in dividing the anterior wall of the canal, and thus exposing the hernial sac. The hernial sac is separated and a small opening made into it. The latter procedure may not be necessary where the contents of the sac are reducible. The sac is separated from the circumference of the abdominal aspect of the internal ring. It is folded up and delivered within the abdomen, and anchored by means of a suture made to traverse the abdominal walls, which suture is tied upon the aponeurosis of the external oblique. The cord is held aside and the walls of the canal apposed with interrupted silver-wire sutures introduced by the Reverdin needle. Commencing below and suturing upward, the aponeurosis, anterior sheath of the rectus, rectus, triangular ligaments of the abdominal walls, conjoined tendon, transversalis fascia, and, finally, Poupart's ligament, are transfixed with the needle and the suture placed; the second suture traverses the aponeurosis, conjoined tendon, transversalis fascia, and Poupart's ligament; the third, the aponeurosis, the fibers of the internal oblique, the transversalis, transversalis fascia, and Poupart's ligament; the fourth and fifth, the same structures as the third suture. Before these are tied the edges of the aponeurosis are apposed by continuous kangaroo-suture, sufficient space being allowed at the upper part of the canal for the exit of the cord. The interrupted silver-wire sutures are now tied, the cord placed in contact with the aponeurosis, and the skin and fascia brought together by either a subcuticular silver-wire suture or interrupted sutures of silkworm-gut. [The suggestion that the defect in the operations of Halsted and Bassini is that they do not correct the tendency to recurrence in the external inguinal fossa is not new. Fergusson, in the *Chicago Med. Recorder*, Apr., 1895, pointed out this fact, and suggested treating the sac by Macewen's method, in order to remove the objection. This is what Deaver advises. We have followed Fergusson's plan in a number of cases, and consider it most valuable. Deaver completes the operation in a different manner, however.]

H. Fischer² discusses **hernias during pregnancy and parturition**. Twenty-four cases have been placed on record, to which he adds 8 of his own. He says that, as a rule, during pregnancy and parturition a hernia is troublesome, although a slight hernia may be cured during this period because of the

¹ Ann. of Surg., Apr., 1898.

² Deutsch. med. Woch., Mar. 3, 1898.

rest and so on which are enjoined. He has seen 2 cases of femoral hernia apparently cured by the use of a truss and the supine position during pregnancy; and has seen cases of umbilical hernia apparently cured by the use of plaster and strips of bandage. He advocates the performance of an operation during pregnancy, or soon after delivery, using Schleich's method of anesthesia.

Alban Doran¹ writes on **hernia of the abdominal cicatrix and operations** for its cure. He tells us that a small protrusion may be kept back by properly applied pressure; but if the protrusion is of large size, it may cause more trouble than did the condition for which the operation was performed. In speaking of such hernias, Greig Smith says there is no narrow neck, as in umbilical hernia, and no dissection of the skin from the parietes by the burrowing omentum or intestine, as in umbilical hernia. The hernial sac is stretched peritoneum; the coverings are stretched cicatricial tissue, with a little fat and skin. In order to cure this condition it is necessary to remove or push aside the redundant or attenuated tissues, and to bring in contact and keep in contact the thick parietes; and to do this it is rarely necessary to enter the abdominal cavity. Doran disagrees with Greig Smith in his description of surgical ventral hernia. He holds that this description can only apply to an early stage of such a complication, and even in the early stage he would hesitate to operate without opening the peritoneal cavity. Doran states that there may be a very tense, narrow neck, and burrowing of omentum and intestine may be found just as in umbilical hernia. Firm adhesion of the intestine to the cicatrix is frequent. Doran then reports 4 cases of his own in which all of the complications noted above were detected. In speaking of the steps of the operation, he tells us that the operator should map out his incision through the protruding skin, and then cut through the skin at the point which seems safest. Complete excision cannot be effected with safety until near the end of operation. If the peritoneum be not closely adherent at the point selected, so much the better; the knife often comes on omentum or intestine, etc. That these operations are permanently curative is to be doubted. Doran next considers hernia of the cicatrix in early stages when no operation is required, and the cause of hernia and the details of the operation for its cure.

Lucas Championnière² publishes his results upon the **radical treatment** of hernia in the past 16 years. He has operated upon 650 inguinal hernias, 501 of which were in males and 49 in females; 46 crural hernias, of which 13 were in males and 33 in females; 22 umbilical hernias, all in females; 14 epigastric hernias, all in males; 12 hernias elsewhere, 2 in males and 10 in females. Of this number, 23 relapsed. The cured cases required no support whatever. The relapses which occurred were in hernias of the large intestine, or in fat or old patients who labored under cough or emphysema, or some other disturbing condition. Sudden emaciation was found to be a notable cause of relapse. The mortality of the operation is very small. In a series of 265 cases there was not a death. In children the mortality is 0.2%. In all his operations the author aims to remove all the accessible omentum, to remove the sac, and to build a new wall as thick as possible.

Bernhard³ has devised a **new operation for the radical cure** of inguinal hernia. He separates the testicle and the cord from the surrounding structures, removes the tunica vaginalis, and places the testicle and cord within the abdominal cavity and outside of the peritoneum, and then proceeds to close the inguinal canal. [To place the testicle in such a position is to subject it to

¹ Lancet, Nov. 27, 1897.

² Lyon méd., Aug. 29, 1897.

³ Correspondenzbl. f. Schw. Aertze, Nov. 1, 1897.

pressure, and to subject it to pressure may lead to sarcoma. We would be unwilling to perform Bernhard's operation.]

Bennecke¹ records a case to show the **dangers of forcible taxis**. The patient labored under a scrotal omental hernia, and a portion of gut passed into the sac and became incarcerated. The patient was anesthetized and the contents of the sac reduced into the inguinal canal; but in accomplishing this the sac ruptured and the intestine and omentum escaped into the space between the peritoneum and the transversalis fascia. Strangulation followed; operation was performed and the patient died.

DISEASES OF THE PANCREAS AND SPLEEN, THE LIVER, AND THE GALL-BLADDER.

John D. Malcolm² records a case of **complete removal of a multilocular cyst of the pancreas**, with recovery. The patient was a woman, 45 years of age, who had detected the lump in the abdomen 7 months previously. The growth was freely movable; the percussion-note over the upper part of the anterior and outer aspect was dull; but over the lower and inner parts was resonant. The right kidney was palpable and appeared of normal size, though somewhat movable. The urine was free from albumin and sugar. The patient in other respects was in perfect health. Malcolm thought the growth to be renal. Six months later the growth obviously contained fluid and the patient had increased 4 pounds in weight. The diagnosis of sarcoma was then abandoned and the growth was looked upon as a hydronephrosis. An exploratory incision was decided upon. It was found that the transverse colon lay in front of the tumor, and above the colon the tumor was covered by peritoneum. In cutting down to the tumor it seemed as though only one layer of peritoneum was divided, the tumor apparently presenting itself to the left of the lesser sac of the peritoneum. The kidney was discovered behind the cyst and the lesser peritoneal sac was not opened. The anterior aspect of the growth was enucleated, an aspirator introduced, and three-fourths of a pint of dark fluid drawn out; a cannula was pushed into another cyst, from which a few ounces of straw-colored fluid were drawn. The openings made by the puncture were secured and the tumor enucleated. In enucleating the base it was observed that the tail of the pancreas was closely adherent to its inner surface. The true nature of this tumor was not suspected, as it was very multilocular and appeared to have solid portions in it. Thinking that the growth was probably malignant, Malcolm decided to remove the mass, in preference to draining it. The growth had arisen from the upper and posterior surface of the pancreas, and a considerable portion of the cystoma had still to be enucleated from the back of the loin-ponch. During the necessary manipulation a cyst burst in the deepest part of the growth and several ounces of dark-colored fluid escaped and was caught on sponges. The posterior attachment to the pancreas was so close that the tissue of this organ had to be divided. There was no pedicle; but when the connective tissue between the gland and the tumor was separated by traction on the tumor the pancreatic tissue was drawn into a cone, and through this cone a double ligature was passed and the two interlocked, one being tied on each side of the trans-fixed piece. The growth was then cut away. After hemorrhage had been arrested the parts were dropped back into the abdomen, when it was seen that free hemorrhage had begun. The pancreas was drawn forward and the artery into the pancreatic tissue secured; but oozing still continued, and it was

¹ Berlin. klin. Woch., Mar. 21, 1898.

² Lancet, Jan. 29, 1898.

found necessary to pass a continuous suture through a portion of raw pancreatic tissue. The bleeding was thus arrested, and the belly was closed without drainage. This patient made a good recovery. Malcolm says that in this case a positive diagnosis could only have been made by withdrawing some of the fluid and examining it. This should never be done except in cases in which the patient is too weak to permit of an exploratory incision. It is highly dangerous to push a trocar into an abdominal tumor of unknown nature, as such a proceeding may lead to dangerous hemorrhage, or may permit irritant fluid to escape into the peritoneal cavity, previously encapsulated septic material or malignant disease may be diffused, and important structures may be damaged. It is well to remember, in this connection, that cases have been reported of pancreas-cysts in which the stomach and colon were so flattened out in front of the growth as to give a dull note on percussion. [One of the editors (Keen) had a case in which, if puncture had been attempted, both the anterior and posterior walls of the stomach would have been perforated.] In 1 case the stomach was perforated by an aspirator. When a pancreatic cyst has been diagnosed and it is decided to drain it, the opening for drainage should be made in the loin, if the tumor presents in that position; but the diagnosis should first be confirmed by abdominal section. If the cyst is drained through the anterior abdominal wall, a long and perhaps funnel-shaped tube will be formed across the abdomen, which is difficult to drain, and may give rise to other troubles. In the author's case, because of the mistake in diagnosis, it was not supposed that loin-drainage would be advisable, and even after the abdomen was opened, because of the thought that the growth was malignant, extirpation was employed. The characteristic feature of these pancreatic cysts is the occurrence of hemorrhages into them. Pancreatic cysts have often been associated with injury, and it has been maintained that they are retention-cysts caused by obstruction of the duct from inflammatory contraction of its walls; but Senn has pointed out that but little dilatation follows experimental obliteration of the duct, and if a part of the gland is physiologically separated from the main duct, it undergoes simple atrophy. He and Cathcart suggest that these cysts are due to rupture of the gland, the formation of an adventitious membrane, and the continued escape of blood and pancreatic secretions into the cyst. The author believes that in his case the tumor was a true neoplasm. If pancreatic cysts can be caused by injury of pancreatic tissue, with effusion of blood and pancreatic secretions into the adventitious sac, there must be some risk that a surgical wound of the pancreas will be followed by a cyst. It is therefore of the utmost importance that a patient whose pancreas has been wounded during operation should for a long period avoid exertion and excitement. Reports indicate that in many instances it is impossible completely to remove pancreatic cysts. Single cysts have been frequently cured by drainage. Knowing these facts, it is not wise to attempt to enucleate every pancreatic cyst, and cysts due to injuries are especially unsuitable for extirpation. When a tumor is multilocular, and when it is connected to the pancreas by a small surface, it is proper treatment to excise. In the case under discussion complete removal produced a more satisfactory result than would partial excision with drainage; but in a debilitated patient an operation of this sort would be highly dangerous and unjustifiable. Pancreatic cyst is a very rare disease. In 6000 postmortem examinations at Guy's Hospital there were only 4 examples of pancreatic cyst, and 1 of these was due to hydatids; so we can state that in over 2000 autopsies there is 1 case of pancreatic cyst. The fluid of some of these cysts is extremely irritating. Cherton aspirated a cyst with a very fine needle, and circumscribed peritonitis resulted from the puncture. In Mal-

colm's case the cyst-walls were very thin, and a blow might easily have caused rupture and effusion of the contents into the connective tissue around.

Alban Doran¹ reports a case of **pancreatic cyst treated by incision and drainage**. The patient was a single woman, 24 years of age. It was noticed that her pupils were markedly dilated; but her general appearance was one of good health. Four years before she had suffered from melancholia, and a year later the melancholia returned, lasting for more than 10 months. During the attack she frequently jumped out of bed at night. There was no history of any fall or injury; but, of course, she might have injured herself by jumping from the bed. During the past 2 years the abdomen had been enlarged. About 18 months ago she had fits of spasmodic pain in the epigastrium, associated with nausea, but without vomiting. During this time she gained flesh. The abdominal tumor was extremely movable, felt smooth, and exhibited fluctuation. There was no persistent resonance on percussion, although occasionally it could be detected at the lower limits of the tumor to the right. The history of spasmodic pain in the epigastrium was not obtained until after the operation, and Doran was inclined to think that he was dealing with a renal tumor. He did not advise paracentesis because he had known cases in which selected "dull" areas proved to be empty, flattened-out gut, and he dreaded blood-vessels and papillomata. He therefore made an exploratory incision, and discovered the stomach drawn tightly over the front of the cyst, the lesser omentum being stretched over the upper part of the cyst. The transverse colon was completely below the cyst. On passing the hand up behind the great omentum it was found that the tumor was too high up to be attacked below the level of the umbilicus. He noted that the transverse colon could be pushed down. He divided 2 in. of the lesser omentum and exposed a distinct wall, inserted an aspirator, and drew off 44 oz. of fluid. The fluid was greasy, opaque, and free from odor. It was faintly alkaline, of a dark-straw color, and contained a considerable quantity of albumin. On standing, an oily material formed on the surface, composed of fat and cholesterolin. A crystalline precipitate formed in it, which suggested tyrosin. A T-forcep was fixed on the puncture in the cyst. The cyst was drawn forward through the puncture and sutured to the parietal peritoneum and the cut borders of the lesser omentum. The forceps were taken off, the puncture enlarged, and a 6-in. glass drainage-tube passed into the cavity of the cyst. This patient made a complete recovery. Doran says that pancreatic cyst is most frequent between the ages of 20 and 30. The urine was perfectly normal in this case before and after operation. We know that sugar may be absent from the urine, even when a very large amount of the pancreas is taken up by the cyst. In some cases of pancreatic cyst diabetes exists. A case has been reported in which the urine was free from sugar when first examined. The cyst was then removed, and on the eleventh day after the operation sugar appeared in the urine, and did not disappear for 3 weeks. In Doran's case the feces seemed healthy. The history of melancholia in this case is of interest, because depression is noticed in cystic disease of the pancreas. This history is of further importance in view of the possibility of injury during the attack of restlessness. In this case there had been attacks of spasmodic pain; but we know that pancreatic cysts do not always cause marked pain; but, on the other hand, we know that other rare tumors in the upper and middle part of the abdomen are painful. For instance, a cyst of the great omentum causes considerable pain. The tumor could be moved laterally, yet its base was fairly broad, and there was no pedicle. Similar lateral mobility is often encountered in perfectly sessile broad-ligament cysts

¹ Brit. Med. Jour., Dec. 18, 1897.

when they rise out of the pelvis, especially when very tense. The majority of pancreatic cysts are movable and fluctuation is marked. The author then details the objections which can be urged against tapping, even for diagnostic purposes, discusses the dilatation of the vessels of the great omentum which exists, and points out the relation of the cyst to the adjacent peritoneal folds. The wall of this cyst was the true wall, and was not a product of inflammation. In his case the base of the cyst did not reach the loin, and it would have been useless to try to tap or drain through the loin. He did not deem it safe to examine the interior of this cyst at the time of operation, as searching within for a calculus is hardly worth the risk. In fact, it is a wild-goose chase to do so. The author then sets forth the difficulties and dangers of total removal of sessile pancreatic cysts. He also gives a review of the bibliography of the subject.

Lawders¹ reports a case of **pancreatic cyst** occurring in a woman, 44 years of age. She suffered from dull pain in the epigastric region; a large fluctuating tumor was detected which had much lateral mobility. The resonance of the stomach could be detected over the upper part of its anterior aspect. The urine showed neither sugar nor albumin. Aspiration was not performed, but exploratory incision was made, and the stomach was found stretched in front of the mass. A trocar was introduced and 5 pints of fluid were withdrawn. The surgeon explored the interior of the cyst, but detected no calculi and could not definitely make out the pancreas. The cyst-wall was closely fused with the stomach and enucleation was considered inadvisable. The edges of the opening in the cyst were stitched to the parietal peritoneum at the margins of the abdominal incision, at the lower angle, and the cavity of the cyst was packed with iodoform-gauze. This patient made a complete recovery.

H. Martyn Jordan² writes on the **conservative surgery of the spleen**. He made a series of studies on dogs, as the result of which he has been led to recommend partial excision in preference to complete excision, showing that the method can be bloodlessly performed, is much safer, and is not followed by the pronounced blood-changes which ensue upon complete excision. The operation is performed as follows: The spleen is made to emerge partly from the wound, lower end foremost, the upper end not being exposed. A pair of clamp-forceps is applied to the lowest arterial branch where it enters the hilus; another pair of forceps is applied to the same artery, about $\frac{1}{4}$ in. farther from the spleen; the tissues between these forceps are then divided with scissors and 2 more forceps applied to the next vessel, and so on, and in this way the gastrosplenic omentum is divided, without loss of blood and without strain on the pedicle, up to the level of the proposed division of the spleen. The lower end of the spleen is then raised with the forceps that are on that side and a continuous ligature is applied, so as to arrest the blood-flow in this portion of the spleen. This ligature is inserted as follows: A long needle is threaded with a coarse piece of twisted silk; it is inserted on the inner or under surface, $\frac{1}{2}$ in. from the border, and passes through the spleen, emerging on the outer or upper surface. The ligature is then drawn through until the ends are of equal length. The free end is brought up around the border of the spleen and the double turn made with the two ends. These turns are drawn around as tightly as possible, the turn being kept over the exit of the needle. The needle is then passed through the spleen, on the occluded side of the organ, as close to the ligature as possible, and $\frac{1}{8}$ in. to the outer side of the turn. The needle is repassed through the spleen, from the under to the upper surface, $\frac{1}{2}$ in. further on, and another turn is taken and drawn tightly. Continuing this plan, the breadth of

¹ Rev. de Gyn. et de Chir. abdom., Nov. and Dec., 1897.

² Lancet, Jan. 22, 1898.

the spleen is traversed, a reef-knot is tied, and the ends are cut short. The occluded end of the spleen is cut short close to the line of ligature. Each portion of gastrosplenic omentum included is then ligated and the peritoneum and muscular cuts are united with continuous sutures.

Ballance¹ writes on **ruptures of the spleen**. He tells us there are on record 4 successful cases in which splenectomy has been performed for rupture without external wound. He records 1 successful case recently operated on by himself. The patient was a boy of 14, who fell from the bough of a tree. On admission into the hospital he was found to have great tenderness in the left hypochondriac region, and both forearms were broken. When a catheter was introduced bloody urine was drawn off. The next day there was an extensive area of dulness in the left flank; the pulse rose to 130, with pallor and restlessness. The abdomen was opened and a great mass of blood-clot was found around the spleen, and this organ was much lacerated. Splenectomy was performed and the patient recovered. There were no serious symptoms during convalescence, such as are often seen when the normal spleen is removed from an adult, and no tenderness of the bones at any time arose; but the lymphatic glands on the right side of the neck, in the left groin, and in both axillæ were enlarged. After the operation there was a diminution in the number of red corpuscles and leukocytes; but this condition lasted but a few weeks. The points of diagnosis in rupture of the spleen are the situation of the injury, the signs of internal hemorrhage, and the extensive fixed dulness in the left flank. This dulness is caused by the presence of a large blood-clot, and dulness in this region is not found in intraabdominal hemorrhage from other causes. This dulness does not change its position as the position of the patient is changed, and is very significant of the injury. The reason that the effused blood coagulates so quickly is that the venous blood from the spleen contains a large number of white corpuscles.

B. V. Beck² records a case of **subcutaneous rupture of the spleen**. A man of 19 had been run over by a wagon. There was a brief period of unconsciousness, followed by violent vomiting. The diagnosis was made of intraperitoneal hemorrhage. Salt solution was thrown into the veins and the abdomen was opened. A large amount of fluid blood was removed, and in the splenic region 500 c.c. of coagulated blood were found and removed. The spleen was seen to be ruptured near the hilus. The rupture passed transversely through the entire organ. The vessels were ligated with silk, the spleen was removed, the abdominal cavity irrigated with salt solution, and the abdomen closed. The patient recovered. It was noticed after the operation that it took a long time for the blood to become normal, it being deficient in hemoglobin and red corpuscles.

Jonnesco³ writes upon **splenectomy**. He has on 11 occasions removed a malarial spleen, and on 1 occasion has performed splenectomy for hydatid cyst. He maintains that in performing the operation the surgeon should be on the patient's right side, as when he is so placed he can see the pedicle better, and thus more easily effect ligation. The median abdominal incision is the proper one, and this incision should begin at the ensiform cartilage and be carried as low as is necessary to effect removal of the spleen. When the abdomen is opened the surgeon should then proceed to isolate the spleen, and this procedure is easy or difficult according to the absence or presence of adhesions and to the tenseness or laxness of the pedicle; if adhesions are very dense or extensive, it may be inadvisable to attempt removal of the spleen. In separating

¹ Boston M. and S. Jour., Apr. 21, 1898.

² Münch. med. Woch., No. 47, 1897.

³ Proc. Internat. Med. Congress, Moscow, 1897.

adhesions the surgeon should prefer to injure the parietal peritoneum or the diaphragm in preference to damaging the spleen. If an adhesion does not contain a vessel, it can be torn through directly. If it is found to contain a vessel, it should, however, be divided between 2 ligatures. If the phrenosplenic ligament is lax and anemic, and does not show vessels, it, too, can be torn through. Otherwise it should be separated into several sections; each section should be tied with 2 ligatures and divided between these ligatures. When the adhesions have once been separated and the phrenosplenic organ has been divided, the organ can be readily enucleated. The spleen is lifted out of the abdominal cavity and turned to the left, upon its convex surface. This exposes most satisfactorily the pedicle. The surgeon should separate each vessel of the pedicle, beginning from below upward, place two ligatures around each one, and divide between the ligatures. While carrying out these maneuvers it is highly important to avoid traction upon the pedicle, and in order to prevent this complication the assistant constantly supports the spleen. The surgeon also should be careful not to rupture any vessel. The safest instrument with which to effect separation is the finger. The splenic artery and vein are occasionally adherent to the pancreas; and if this is found to be the case, throw 2 thick ligatures around both of the vessels, tie them together, divide between the ligatures, and then tie each vessel separately. The gastrosplenic omentum is in reality but a continuation of the pedicle, and is divided after the same manner. When the spleen has been removed a careful search should be made for bleeding-points, and all bleeding should be arrested. A bleeding-point can generally be discovered upon the pillar of the diaphragm, behind upon the vertebral column, by drawing the stomach and intestines to the right. It arises from division of the phrenosplenic ligament, and can be arrested by suturing the peritoneum over it. During the first few days after the operation Jonnesco advises the administration of opium. If the patient is much exhausted he uses intravenous injections of artificial serum. Jonnesco has collected 36 recorded cases in which splenectomy was performed for malarial hypertrophy; the death-rate was 50%. In the cases from 1891 to 1896, however, the death-rate was but 15%. Authors generally state the following contraindications to operation: Marked cachexia, extensive adhesions, great size of the organ, and leukocythemia. Very great cachexia is a contraindication; but the exact degree contraindicated must be left to the judgment of the surgeon. The same may be said of adhesions. Jonnesco thinks that the determination whether or not the adhesions are so extensive as to prevent the operation depends upon the following points: First, Can the patient stand a protracted operation? Second, Is there much ascites? If there is, this affects the general condition of the patient. Third, Is the splenic tissue very friable? If it is, the danger of loosening adhesions is greatly increased. Jonnesco does not think that great size of the spleen is a contraindication; but he believes that leukocythemia is always a contraindication, and that operation in this condition is invariably fatal. Jonnesco believes that it is not wise unduly to protract medical treatment in cases of malaria, because as long as the spleen is hypertrophied from malaria cachexia increases, and the chances of cure by operation diminish. He thinks that in these chronic cases splenectomy is often indicated. He says that when the spleen has been removed the toxicity of the urine does notably decrease, and the author does not think that the spleen eliminates toxins. He thinks that the spleen manufactures toxins, and when it is removed less toxin goes to the urine. He noted an increase in red corpuscles soon after operation, an increase so marked that it seems to him to be evident that when the spleen is removed the cause of the malarial cachexia is

eliminated. The leukocytosis markedly increased after splenectomy, but this condition is temporary. [We cannot bring ourselves to think with Jonnesco that so dangerous an operation as splenectomy is justifiable in malarial spleen.]

Frank Hartley¹ writes on **splenectomy**, and reviews the reported cases of splenic disease and the condition of the blood after the removal of the spleen. He thinks that in malaria, when internal medication has failed and when a change of climate has not cured, if there is beginning cachexia, enlarged spleen, pain, and pressure-symptoms, that splenectomy should be performed. The operation is indicated in hydatid cysts, wandering spleen, hypertrophy of spleen, benign tumors, large cysts from hematoma. If these conditions show pressure-symptoms, splenectomy should be done. In abscess of the spleen splenectomy should be performed. In axial rotation of a wandering and enlarged spleen, with or without sepsis, the indication is for operation, either splenectomy, or, in some instances, splenopexis. In primary sarcoma the indication is for removal of the affected organ. If the growth is secondary or cachexia is present, an operation is contraindicated. In trauma of the spleen the indication is for a splenectomy, if traumatic anemia follows the injury; or, in some cases, splenotomy and suture. Hartley then reports a case of malarial hypertrophy of the spleen in which he successfully performed splenectomy, and a traumatic rupture of the spleen in which he successfully performed the same operation. His observation leads him to think that in splenectomy the red blood-cells and hemoglobin are greatly diminished and the leukocytes increased, and that in from 10 to 23 days after the operation the red blood-cells and leukocytes are again in a normal ratio, although a deficiency of hemoglobin may persist for months. [The mortality for such operations was estimated by Plücker² as follows: In leukemic spleen the mortality after splenectomy is over 90%; in essential hypertrophy, 57%; in malarial hypertrophy, 55%; in hydatids of the spleen, 40%; in sarcoma, 30%. It seems thus, from a study of reported cases, that operation in leukemic spleen is practically always fatal.]

Moore³ reports a case of **rupture of the liver** successfully treated by operation, in a boy of 11, who was kicked by a horse. He went into collapse and had great pain in the side; the diagnosis of rupture of the spleen was made. In a few hours the abdomen was much distended, this distention continuing for 5 days. The bowels were moved after the use of enemata. Five days after the accident vomiting began; the vomited matter was of a greenish color; the bowels now became obstinately constipated. The patient suffered from pains at times which occurred in paroxysms. He was thin and pale and lay on his back with knees drawn up. The temperature was normal, the pulse was small, rapid, and compressible, the general abdominal area was not distended, and great tenderness was noted over the liver. After a few days the bowels acted; but in a short time a swelling was discovered below the ribs and to the right of the middle line, and there was dullness over the right side of the chest, almost to the clavicle. The abdomen was somewhat distended and tympanitic. These conditions grew slightly more marked, while the area of the liver-dullness became a little increased downward in the mid-axillary line. Temperature was slightly elevated. Aspiration of the right side of the chest was performed in the sixth interspace, and 24 oz. of bile-stained fluid were withdrawn. Two days later the abdomen became greatly distended, and an incision was made to the right of the mid-line, just below the ribs. The parietal peritoneum appeared to be much thickened, and on opening the abdominal cavity a mass of dark fluid, containing clotted blood and bile, was found. It lay in

¹ Med. News, Apr. 2, 1898.

² Deutsch. med. Woch., Aug. 12, 1897.

³ Lancet, Sept. 18, 1897.

the cavity some 6 in. deep, and extended upward toward the diaphragm. The lower boundary of the cavity was the surface of the liver, and adhesions shut it off from the general cavity of the peritoneum. The cavity was irrigated and drained, and the boy, after some complications, ultimately recovered.

James Kerr and J. H. Ford¹ report a case of penetrating **wound of the liver**. The wound was inflicted by a bullet from a 22-caliber rifle. The boy was profoundly shocked, there were great pain and tenderness in the epigastric region, the pulse was rapid and weak, respirations shallow and quick, pupils dilated, and temperature subnormal; but there was no nausea or vomiting. The wound of entrance was between the eighth and ninth ribs, on the right side, and 6 cm. to the outer side of the nipple; and that of exit 7 cm. above and to the left of the umbilicus. Through the latter a piece of omentum 4 cm. in length protruded. Strychnin and morphin were given hypodermically. At 9 o'clock the abdomen was opened, and a clot was found on the surface of the liver. The left lobe showed an extensive laceration, from which blood was flowing freely, extending across the notch, and there was bleeding also from the opposing surfaces of the notch. This hemorrhage was controlled by the application of compresses wrung out from hot salt solution. The laceration was sutured with silk. It was found necessary during the proceeding to give the patient 2 liters of normal salt solution into a vein. The abdominal incision was extended, and a wound 20 cm. long was found crossing the convex surface of the right lobe of the liver, extending, as did the one in the left lobe, to a depth of 3 to 5 cm. This wound was sutured and a quart of hot salt solution was poured into the abdomen. The wound in the belly was rapidly closed. Uninterrupted convalescence followed. The author says that there are on record 51 cases of wounds of the liver; 33 recovered and 18 died, a mortality of 35.2%. In 4 of these cases no operation was performed, and in order to obtain the mortality of the remaining cases we should say that of 39 cases operated on 26 recovered and 13 died, a mortality of 33.3%. The statistics show that a suture should be employed to arrest hemorrhage, and if this fails, the cautery or tampon. Edler states that the general mortality of liver-wounds is 66.8%; but in some cases the wound was not treated surgically, and in others it was complicated by injury to other viscera. Mayer has estimated that the mortality in 61 cases of gunshot-wounds which he has studied is only 34.4%. Although the liver-wound should be treated by suturing, there are, of course, some cases in which this method is impracticable, and treatment by tamponing or the cautery is the only resource. Cauterizing alone has but little effect in arresting hepatic bleeding, because of the extreme tenuity of the vessels and the great vascularity of the organ. Cautery will not arrest hemorrhage from a large vessel. The vessels should be ligated separately; or if large vessels are inaccessible, a tampon should be employed. If sutures are used they should be inserted from $\frac{1}{3}$ to $\frac{1}{2}$ in. from the edge, and should be drawn only sufficiently tight to produce contact of the sides of the wound at the site of the hemorrhage. It is not advisable to operate until the patient rallies perceptibly from shock. Uncontrollable oozing of blood and the increase of capillary bleeding as the heart becomes stronger are against immediate operation. As the heart becomes stronger we operate when the patient is in a condition which might be regarded as hazardous in the case of many other major operations.

Babacci has maintained that suture is the only justifiable treatment; but this conclusion is not warranted by the facts. He prefers the elastic suture, first, because it is perfectly supported by the animal tissues and the part of

¹ Med. News, Aug. 14, 1897.

the liver which encapsulates it. Second, it can be threaded in a needle smaller than its own diameter by cutting it obliquely. Third, it enters the wound in the hepatic capsule with facility, because its elasticity renders it slender when drawn through the tissues, and when traction stops it thickens and fills up the hole through which it has passed. Fourth, unlike other threads, it does not rub or saw in its passage, and it is less liable to cut its way out. Fifth, the liver is an organ which is subject to great normal oscillations in volume; the elastic suture causes less tension than does any other, for it yields before congestion, yet holds the surfaces apposed when the organ shrinks. An elastic suture should never be fastened with knots, but the ends should be doubled over upon themselves about $\frac{1}{2}$ cm., and tied with silk or fine catgut, while held closely to the edge of the tissue.

W. W. Keen¹ reports a case of **angioma of the liver** which was removed by elastic constriction external to the abdominal cavity. An attempt was made to remove this tumor by incision into the liver-substance surrounding it. The attempt was abandoned, and an artificial pedicle was formed, around which was fastened an elastic rubber tube. The tumor was drawn outside of the abdomen and surrounded by iodoform-gauze. On the sixth day the rubber ligature was removed, and the small pedicle remaining was divided by a pair of scissors, without the loss of any blood. The article contains a table of 39 cases of resection of the liver, in addition to 20 cases previously reported by the author.

Christopher Martin² records an interesting case in which a pedunculated **accessory lobe of the liver** was successfully removed. The diagnosis in the case was doubtful, and it lay between a tumor of the kidney and a tumor of the liver or gall-bladder, a tumor of the mesentery and an ovarian tumor which had become attached in the right upper abdomen. The author's own idea was that it was an unusually mobile cystic kidney. An exploratory incision was made. The tumor was found to be a smooth mass, attached by a broad vascular pedicle to the anterior border and under surface of the liver. The gall-bladder was firmly attached along the inner half of the anterior surface of the tumor. The pedicle was about 3 in. long and 4 in. broad, and was composed of a cystic duct, huge arteries and veins, and fibrous tissue surrounded by peritoneum. The glandular substance of the liver was not continuous with the substance of the tumor. Martin determined to extirpate it, together with the gall-bladder. He ligated and divided. The rest of the pedicle was secured with 3 interlocking ligatures of stout silk, and the whole mass cut away with the gall-bladder. The incision was closed without drainage, and the patient made an excellent recovery. The examination of the growth showed it to be a pedunculated accessory lobe of the liver, which lobe had become the seat of a sarcomatous change and interstitial hemorrhage.

Michi³ makes a report upon a case of **movable liver**, which he anchored 10 years ago. The liver at present shows only normal mobility. The incision started at the tip of the eleventh rib of the right side, and was carried back to the loin; the ligaments were shortened, the peritoneal investment was rubbed, the wound was sutured, and a support applied.

Wm. D. Jones⁴ suggests an improved technic for the avoidance of **fistula after opening the gall-bladder**. After opening the gall-bladder and completing the operation, the viscus is brought up so that the opening in it is on a level with the outer surface of the abdominal muscles. The parietal layer of peritoneum is closed up to the gall-bladder, and is then attached to the gall-

¹ Penna. Med. Jour., Oct., 1897.

² Birmingham Med. Rev., Feb., 1898.

³ Gaz. hebdom. de Méd. et de Chir., Sept. 9, 1897.

⁴ Ann. of Surg., Jan., 1898.

symptoms, and the diagnosis. In considering the treatment of total hepatoptosis, they say that we should first try an abdominal support; but if palliative means fail, operation should be adopted. The 3 operations carried out have been, hepatopexy, or suturing the liver in position, Depage's operation, and Pean's operation. In hepatopexy the liver is pulled into its normal position and supported by an assistant; 6 or 8 sutures of thick catgut or silk are employed. The sutures should be inserted 1 in. apart, and should be carried deep into the liver-substance and through all the layers of the belly-wall except the skin. Lannelongue advises that an area, 2 in. by 1 in., on the convex surface of the liver, should be scratched with a bistoury, so as to cause the ready formation of adhesions. Of 11 cases treated by this method, 8 were cured, 1 relieved, 1 recurred, and 1 died of peritonitis. Depage, believing that relaxation of the abdominal wall plays the chief part in the affection, resects an area of skin on the abdominal wall. He makes incisions down to the aponeurosis, and an incision from the tip of the eleventh rib on one side to the same point on the opposite side. From each end of this incision an oblique incision is made, passing down as far as the level of the umbilicus in the horizontal direction, and half the length of the first incision. From the lower ends of this second incision two curved incisions are carried downward, having their convexity outward and meeting below in a point. The enclosed area of skin is cut away, the linea alba and peritoneum below are resected, and the umbilical ligament of the liver and the lower end of the falciform ligament are drawn into the upper angle of the wound and sutured there. The abdominal wall is sutured by layers, the oblique margins of skin being sutured, and the transverse and the vertical margins below are brought together. Three cases have been treated by this method; 2 were cured and 1 died. Pean reaches the liver by a transverse incision, places the liver in its normal situation, separates the anterior parietal layer of peritoneum and sutures it with silk to the posterior parietal layer, thus making a shelf which will hold the liver in position. Pean has operated upon 1 case which was successful. There are 3 methods of treatment for partial hepatoptosis. First, tying the pedicle and removing the lobe; second, stitching the floating lobe to the parietes; third, treating any existing lesion of the biliary ducts. This has been carried out in 7 cases, and in each case the floating lobe atrophied.

Fontan¹ writes on the operative treatment of **abscess of the liver**. He makes a large incision, sutures the costal pleura to the diaphragmatic pleura, if the chest is opened; sutures the parietal to the hepatic peritoneum, if the abdominal cavity has been opened. If an abscess-cavity has been entered, he carefully cures its walls. The best point to open a hepatic abscess is in or a little behind the axillary line, at the level of the eighth, ninth, or tenth rib, and from one of these ribs a piece from 6 to 8 cm. in length should be resected. A transpleural operation is to be preferred when it can be performed. The author does not think that curetting will lead to either hemorrhage or a free flow of bile, because the blood-vessels and bile-ducts in the abscess-cavity are sealed by thrombosis.

Halsted² has devised miniature hammers to facilitate **suture of the bile-ducts**. He tells us that suturing of the thickened duct is difficult enough, and suture of the normal duct has been considered by some almost impossible. The result of suture, even of an abnormally thickened duct, is so uncertain that it is the practice of all surgeons to wait weeks, months, or years for the duct to dilate greatly and thicken, rather than to interfere promptly in case of obstruction of the common duct by stone. He does not think that the

¹ Bull. et Mém. de la Soc. de Chir., No. 7, 1898.

² Phila. Med. Jour., Apr. 2, 1898.

operation should ever be postponed for the purpose of letting the duct become thicker, because, as a matter of fact, the normal bile-ducts can be sutured easily, accurately, almost infallibly, and without danger of leakage or constriction. The duct lies in a deep hole far from the surface, and is covered by the liver, which is usually enlarged. Frederick Lange suggested cutting through 1 or 2 ribs and the diaphragm when the liver is large, and this suggestion is of great value; and not only when the liver is large, for it is valuable when the organ is small and high up under the ribs and the duct is carried up with it. In order to suture the bile-ducts Halsted uses aluminum hammers of several sizes. The ducts should be clearly exposed, and it is advisable to incise the common bile-duct near its duodenal end, because the diverticulum of Vater can be more thoroughly explored through an incision at this end of the duct. Before incising the duct two presection-stitches are introduced to serve as retractors. These stitches, which are subsequently removed, should enter the lumen of the duct closely together, and the incision into the lumen of the duct is carried between them. The stone having been removed, and the gall-passages searched thoroughly with probe and fingers, the retractor-threads are drawn apart and a hammer is introduced; by means of this hammer the duct is raised from its bed and drawn toward the operator, and mattress-stitches are applied. The stitches necessarily perforate the wall of the normal duct, but no harm results from this perforation, for the normal duct practically always, and the thickened duct usually, is sterile, and the stitches soon cut their way out of the lumen and

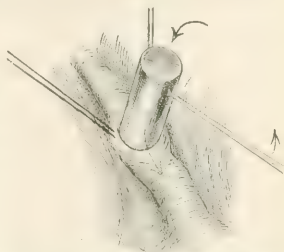


FIG. 36.—The introduction of the hammer into the duct (Halsted, in *Phila. Med. Jour.*).

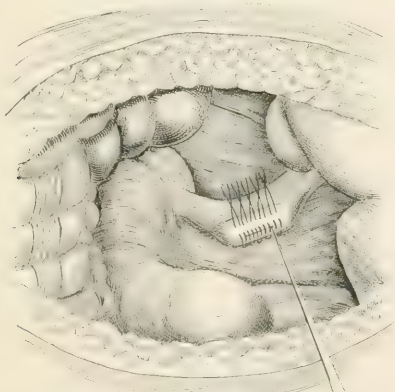


FIG. 37.—Suture of duct over hammer (Halsted, in *Phila. Med. Jour.*).

out of the duct. After the stitches have been introduced the hammer can be withdrawn and the stitches be tied.

Christian Fenger¹ writes upon the **surgery of the bile-ducts**. He tells us that there are 3 factors in the causation of the pain of biliary colic: incarceration, inflammation, and retention. Contraction of the wall of the duct around the stone, or pressure of a stone too large for the duct against its walls, may cause an attack. Inflammation of the wall of the duct in the region of the stone injures mechanically and creates an area prone to infection. Attacks of pain and fever at intervals of months are found in most instances of remittent attacks of inflammation of the gall-bladder. Can the inflammation, however, be the cause of the daily colic, or pain occurring every few weeks? Billings and Vater have both shown that a small stone in the diverticulum of Vater which does not obstruct, may cause this colic. He thinks in this case the small stone lay loosely in Vater's diverticulum. A daily or weekly exacerbation of an existing subacute inflammation takes place, which gets better and worse at intervals. Retention of bile behind an obstruction may cause biliary colic; but it is probable the sudden obstruction only causes an attack of colic, as none occurs in gradual obstruction. We are not able with our present knowledge to tell from the clinical symptoms which of the three etiologic factors are operative in a given case. Acute disease of the bile-duct sometimes simulates acute intestinal obstruction. Stones with facets, pyramidal stones, are usually from the gall-bladder. Stones with two parallel facets, barrel-shaped stones, are usually from the ducts. Single and spherical stones without facets may occur anywhere; but such stones, when multiple, often come from a dilated common duct. Fenger then reports a case in which there were repeated attacks of biliary colic and icterus, but no tumor. Operation was performed. The cystic, hepatic, and common ducts were dilated and filled with stones. The gall-bladder was small, containing stones; it was opened and the stones removed. The patient completely recovered. In some cases quantities of gravel are found behind a large obstructing stone. Means of identifying as gall-stones concretions passed with feces is evident, as it may give us a positive diagnosis in tracing vague symptoms. It is as yet impossible clinically to diagnose between disease of the gall-tracts caused by stones and that caused by bending or valve-formation. The author then discusses the question, Should the operation of cholecystostomy in two stages be abandoned?

Courvoisier's statistics showed the mortality to be the same—10%—whether the operation is performed in 1 or 2 stages. Many operators have entirely given up the 2-stage operations, and others only resort to it exceptionally. The chief objection to the operation in 2 stages is that it does not permit us to remove incarcerated stones from the neck of the gall-bladder or the ducts. Riedel maintains that the operation should be done in 2 stages when there is a small, deeply seated gall-bladder which cannot be brought out and sutured to the parietal peritoneum. Fenger is not willing to abandon entirely the operation in 2 stages, as it is safer against infection of the peritoneum than the operation in 1 stage. It protects thoroughly when we operate for a suppurating gall-bladder. He has never had a patient die from the effects of an operation in 2 stages; and in 1 case of cholecystostomy in 1 stage he had a fatal septic peritonitis. If the object of the cholecystostomy is not so much to remove stones as to drain a septic gall-bladder, the 2-stage operation is the only rational one. If we have to operate during an acute attack of cholecystitis, and find a small deeply seated and adherent gall-bladder, the 2-stage operation is preferable. There is another reason besides safety in some complicated cases—that is, that simple drainage of the gall-bladder relieves symptoms and brings about a change in the pericystitis, so that hard adhesions become soft

¹ Ann. of Surg., June, 1898.

and a previously adherent organ becomes movable, and at the latter operation the bile-ducts can be successfully isolated without rupturing the gall-bladder or intestines. For the young surgeon who begins to operate on the biliary tract it is better to perform more cholecystostomies in 2 stages, even at the risk of making incomplete operations, than to venture too far into a more complete operation and lose the patient. Fenger then considers abscesses or fistulas. He states that the greatest difficulty is encountered in the cases where abscesses are located between the biliary and the intestinal tracts. He discusses displacement of the gall-bladder and the entire liver. He inquires in what cases should we operate, and when. He says there is great difference of opinion in answering this question between internal medicine and surgery. Operation is now performed earlier than formerly, when only desperate cases sought the aid of the surgeon. The local conditions which make operation difficult or impossible are produced by recurrent attacks of infection and inflammation. The earlier the operation is done the less in number and severity are the complications likely to be encountered, and the shorter, therefore, will be the operation. In cases with remittent attacks operate in the interval of rest, as in appendicitis, because in these intervals the adhesions are less rigid and edematous and the microbes less active. When stones are being passed with the feces, wait the result and see if relief does not follow. In choledocholithotomy find and remove the stones. If a stone is allowed to remain a second operation may become necessary. It is a question where these stones hide, so that they are occasionally missed by the best surgeons. They may slip into a dilated hepatic duct; but if they do so they can be felt with the finger or a probe. Fenger believes that they are apt to hide in diverticula. In order to detect stones after the common duct has been opened he has devised a flexible metallic probe made of spiral wire. If the probe strikes a biliary calculus a click will be felt, and if the probe glides past a partly hidden calculus there will be a grating sensation. The wound in the common duct should always be closed with sutures. The difficulty in operating upon the ducts becomes greater as we approach the duodenum.

GENERAL CONSIDERATIONS IN REGARD TO THE ABDOMEN.

Reuben Peterson¹ writes on **tuberculosis of the mesentery lymphatic glands**, and recommends that it be treated by abdominal section. He reviews the literature of the subject, and reports several cases of his own in which abdominal section has proved successful. He maintains that primary tuberculosis of the mesenteric glands is not uncommon; though it may be secondary to intestinal tuberculosis, the disease of these glands is usually primary. Tuberculous mesenteric glands may be congenital, and the tubercle-bacilli may remain latent in these organs for a considerable period of time. Under favorable conditions a beginning tuberculous can be diagnosed before the existence of a palpable tumor. Such glandular enlargements may be caseated or calcified. If caseation occurs there is great risk of the extension of the processes to the peritoneum. Tuberculosis of the glands, if treated in time, is not of necessity a fatal disease, if increased tissue-resistance can be brought about. Abdominal section produces a powerful physiologic change in the peritoneum. It has been shown that all varieties of tuberculous peritonitis are capable of cure by celiotomy, the explanation of this being in the physiologic action of embryonic cells along with the formation of new vessels and connective tissue. This new tissue may remain as fibrous nodules, or may be

¹ Med. News, Aug. 28, 1898.

subsequently absorbed by the peritoneum. The peritoneum lies upon a bed of lymphatics, for which the mesenteric glands are filters, and there is every reason to believe that the same changes which celiotomy will produce on peritoneal tuberculosis it will produce on tuberculosis of the mesenteric glands. The operation should be performed as soon as the abdominal symptoms make the diagnosis reasonably certain.

Demons¹ writes upon **contusion of the abdomen**. He says that such a contusion may damage the abdominal wall, may damage intraabdominal organs as well as the wall, or may damage intraabdominal organs without injuring the wall. It is often impossible to make out the extent of an injury. Every detail of the accident should be carefully gathered. In regard to the nature of the body inflicting the force, the degree of force, and area to which it was applied, we should remember, too, that the abdominal resistance varies with the age, state of obesity of the muscles, and the obesity of the subject. The most harmful form of blow is one which is perpendicular, for the parallel blow has a tendency to glide off. A hollow viscus is most apt to be damaged when it is distended. If an organ or viscus is in an unhealthy condition, it may be lacerated. A deeply seated pain which is localized would suggest wound of the viscus. The wound of a simple contusion of the abdominal wall is usually attended by sharp pain. Ecchymosis is of no value whatever in forming a diagnosis, and vomiting or slight tympany does not point to intraabdominal injury. Rigidity of the abdominal walls is an important sign, and suggests injury of the viscera. Always remember that the symptoms of an abdominal injury may be masked by symptoms produced by other injuries; for instance, fracture of the skull, of the spine, or of the limbs. Exploratory celiotomy is not justified in very mild or extremely severe cases. When it is considered proper to employ it it should, if possible, be applied within the first 24 hours of the accident.

Nimier² writes on **abdominal contusions**. He propounds the query, Should the surgeon immediately perform laparotomy upon every patient who has suffered a severe abdominal contusion? The view of Nimier is that this should not be done invariably. He has had 7 cases during the last year in which he did not operate, and in which recovery ensued. He has collected 307 cases of contusion of the abdomen, from the kick of a horse, treated without operation; 215 recovered and 92 died. Of 36 cases in which operation was practised, 26 died and 12 recovered, and in only 3 of these cases could operation have been considered as imperatively necessary. In 1 of the cases which recovered after operation there was no injury of the intestine and there was no blood in the peritoneal cavity, and the inference is just that recovery would have taken place if the operation had not been performed. Unfortunately there is no absolute sign which will enable us to be sure that the intestine has been injured. It is usually necessary to await development of symptoms. The amount of shock is no gauge of the extent of the visceral damage, and neither is the degree of localized pain. The best rule is to watch the patient carefully, the surgeon being ready to operate at a moment's notice. Nimier says that there are 4 types of condition which may ensue upon the rupture of the peritoneum due, for instance, to horse-kick. In the first type there are positive peritoneum-symptoms. The pain becomes general and agonizing, muscular rigidity becomes marked, abdominal distention becomes pronounced, and then appear nausea, hiccough, vomiting, constipation, and retention of urine or even complete anuria; there are hyperpyrexia, the peritoneum-face, rapid and small pulse, delirium, collapse, etc. In this condition there is purulent peritonitis

¹ Sem. méd., Oct., 1897.

² Arch. de Méd. et de Pharm. mil., Mar., 1898.

with false membrane. In the second type the peritoneal reaction occurs as in the first type; but there is subnormal temperature instead of hyperpyrexia, the pulse and respiration being extremely rapid. In this condition there are great vascular congestion and ecchymosis, with false membrane. In the third and fourth types the peritoneal reaction is by no means marked, the symptoms being rather those of general intoxication. In one type there is high fever, and in the other subnormal temperature. These conditions are instances of septicemia. It is a safe rule, upon the first evidence of peritoneal reaction or general intoxication, to perform laparotomy.

The author thinks that as soon as a patient is kicked in the abdomen by a horse he should be taken to a hospital, a careful history of the accident taken down, and the patient treated expectantly. He should be placed in bed, heat applied, pain relieved, and should be given no food; every half hour the temperature and respiration should be recorded, with a note of the general condition and the local symptoms. The moment that peritoneal reaction or general infection is evident the abdomen should be opened.

Delagenière¹ maintains that the **usual methods of draining the abdominal cavity** after operation are faulty. He thinks that we should drain the cavity in the same manner that a spirit-lamp is drained by a wick. He takes a perforated nicked tube and passes into it a skein of absorbent cotton which fits tightly the interior of the tube and is projected from either end of it, the projecting ends being frayed out. The tube and cotton are, of course, sterilized before being used. This cotton can be renewed whenever necessary without removing the tube. This tube should never remain in place longer than 36 hours. The tubes used by this surgeon are from 8 to 10 cm. in length and 15 to 20 mm. in diameter.

Volkovitch² writes upon the **prevention of hernia after celiotomy**. He thinks that the great cause of the hernias which follow operation are the methods of incision employed. He does not believe in incision through the linea alba, but prefers an incision through either rectus muscle. The wound should be closed by layers of knotted sutures. The first layer includes the peritoneum and the deeper portion of the rectus sheath; the second layer includes the remaining tissues except the skin, and the skin should be closed by a continuous suture. In operations on the lateral portions of the abdomen the muscular and tendinous structures should be supported in the direction of their fibers, and not divided across, as is usually done. In the lower part of the lateral region the incision should have a direction from above downward and inward—that is, parallel to the fibers of the external oblique, which are then separated along their course. These fibers are then separated by retractors, exposing the internal oblique, which is opened up in the same manner in the direction of its fibers. The margins of this muscle are then drawn apart and the transversalis comes into view. As the transversalis becomes aponeurotic at its inner side, the separation of the fibers toward the rectal sheath has to be done with a knife or scissors. The peritoneum is opened transversely in the direction of the incision in the transversalis. In order to prevent the peritoneum from passing under the margins of the wound it should be stitched to these margins during the operation. In order to close the wound one series of sutures unites the peritoneum and the transversalis, another the internal oblique, and another the external oblique, and the skin is closed with a continuous suture. In the removal of the appendix the above operation does not give quite enough room. The incision can be enlarged by taking the last

¹ Bull. et Mém. de la Soc. de Chir., No. 12, 1898.

² Vrach. No. 5, 1898, abstracted in Brit. Med. Jour.

transverse incision through the rectal sheath, and even through the margin of the rectus muscle; this is better than adding a longitudinal incision at the outer margin of the rectus sheath.

Roger¹ discusses the **surgical use of the omentum**. He maintains that it is a lymphatic ganglion. In rabbits and guinea-pigs he removed the omentum as thoroughly as possible, and then at varying periods after the operation he injected into the abdomen, above the umbilicus, cultures of pus-organisms, control-experiments being made with unmutated animals. Control-animals survived; while animals on which removal of the omentum had been performed died in a few days.

Sonnenberg² discusses the differential diagnosis of inflammatory conditions and **tumors of the ileocecal region**. He maintains, as is well recognized, that inflammatory conditions of the female pelvic organs may resemble appendicitis; but he further asserts that trouble with the gall-bladder, liver, kidneys, or pancreas may also be simulated. A point of importance is to note whether or not a swelling is movable. An exudation from appendicitis is never movable; and therefore if we find a movable swelling the case is not appendicitis. The reverse of this statement is, of course, not true, for a cancer, for instance, may be entirely immovable. Insufflation of the intestine with air may assist in the diagnosis, a new growth of the intestinal wall making the tube so rigid that it cannot be dilated with air. Tuberculosis of the ileocecal region may produce an extensive infiltration, which may be difficult to separate from appendicitis or carcinoma; but the history of the case is here very important. Of course, if the appendix itself is tuberculous there may have been typical appendicial attacks, and in such a case the differential diagnosis is practically impossible. Error may arise from sarcoma, myoma, or dermoid cyst, and forms of intestinal obstruction, particularly invagination. If there is complete obstruction of the bowels the case is in all probability not appendicitis, for in this disease obstruction only comes on gradually. An abscess near the vertebral column or in the psoas region is posterior to the iliac fossa, and therefore is flat and does not project; and the pain in these cases is distinctly toward the right, and is apt to run into the genital organs. The peritoneal symptoms also are wanting. If the exudation is situated high up in a case of appendicitis the case may strongly simulate disease of the gall-bladder or liver, as in both cases there may be chills, fever, nausea, pain, tenderness, and muscular rigidity. In gall-bladder- or liver-trouble, however, the pain passes toward the shoulder; whereas in appendicitis it passes toward the umbilicus, the most painful point being in the ileocecal region. The most painful point in hepatic affections is close to the border of the ribs. Vomiting is much more marked in liver-trouble than it is in appendicitis. In appendicitis there is a zone of tympany between the abscess and the hepatic region. There may be jaundice in each case. Empyema of the gall-bladder not unusually increases difficulty of diagnosis. Sonnenberg calls attention to the fact that it is usually believed that men suffer from appendicitis more frequently than women. The relative frequency is expressed by the figures 60 and 40. It is contended that a woman's appendix has a better blood-supply than has that of man. The additional blood-supply is contained in the ligament which passes from the right ovary to the appendix. Pelvic peritonitis, acute perimetritis, perisalpingitis, and perioöphoritis may be confounded with appendicitis. The position of the mass is of the utmost importance in making a diagnosis. In appendicitis the mass is higher up than it is in pelvic disease, and it can very seldom be detected by a vaginal examination. In this case, however, the

¹ Sem. méd., Feb. 23, 1898.

² Berlin. klin. Woch., Sept. 15, 1897.

position of the pelvic organ to the tumor is usually made out in the median line; the situation of the mass is but little aid in the diagnosis. The exudation of a pelvic peritonitis is usually felt in Douglas's cul-de-sac, and pushes the uterus forward. In the early stages such exudation is fluctuating. On account of congestion the mucous membrane of the rectum is swollen and secretes an abnormal quantity of mucus, and bits of membrane are exfoliated. Acute troubles of the adnexa usually begin with vomiting, and often hiccough, and the trouble is located by the patient in the neighborhood of Poupart's ligament. In some cases of pelvic trouble the pains extend toward the genitals rather than toward the epigastrium. The constitution is not nearly so much involved as in appendicitis, and there are no evidences of diffuse peritonitis. The high situation of the tumor and pain being localized to the right side would indicate that the appendix was the organ involved. In chronic pelvic disease in which recurrent attacks occur the symptoms are positively aggravated at menstrual periods. Sonnenberg calls attention to the fact that in some cases tubal pregnancy may be complicated by appendicitis.

Erlach¹ maintains that **large dressings** should never be employed after celiotomy, because if they are employed the surgeon is prevented from constantly observing the condition of the wound. He dresses his abdominal wounds with a piece of aïrol. If evidences of peritonitis appear and do not rapidly pass away under treatment, he opens wide the abdominal wound and allows it to remain open, inserting strips of sterile gauze, and placing enough gauze over the wound to cover it. Opening the wound decreases the intra-abdominal pressure, limits peristaltic movement, and affords free drainage.

Miles F. Porter² writes on **tympanites**. He maintains that intraintestinal tympany in itself often kills patients who are suffering from abdominal and pelvic diseases, and that it may also do so in cases which are neither pelvic nor abdominal. Tympany in the course of a serious illness is a very bad symptom which calls for prompt treatment. If relief is not obtained by cathartics, the use of the rectal tube, and the administration of enemata, the belly should be opened and the gut incised. In a case of general peritonitis with obstruction of the bowel celiotomy and incision of the gut should be performed as soon as the diagnosis is made. Puncture of the bowel should only be made when the patient is *in extremis*, and then only in such a case as typhoid fever without perforation, pneumonia, etc., in which there is no other cause for laparotomy except the tympany itself.

Geo. Woolsey³ discusses **abdominal incisions**. He objects to the vertical incision in the semilunar line for appendicitis, because it is peculiarly apt to be followed by hernia. It divides some of the nerves which supply the rectus, and thus leads to atrophy of that muscle, and consequently to weakening of the belly-wall. The incision is nearly entirely through fibrous tissue, and after healing the scar will be thin and weak. This incision should only be used for pus-cases in which the tumor lies far internal, for in such cases "the saving of life far outweighs future consequences of the incision." Woolsey says of the incision advocated by Jalaguier and Kammerer, that while it gives ready access to the appendix when that diverticulum is in its usual position (pointing inward), it almost certainly cuts several nerves. In spite of the fact that it must be followed by some muscular atrophy, the trap-door nature of the wound renders the emergence of a hernia very improbable; hence this incision is infinitely better than the vertical incision in the semilunar line. The Jalaguier-Kammerer incision must only be used

¹ Wien. klin. Woch., Jan. 20, 1898.

² Med. News, July 31, 1897.

³ Ann. of Surg., Jan., 1898.

in the quiescent stage of appendicitis, as the incision is too tortuous to permit of drainage in a pus-case, and, furthermore, pus might diffuse within the opened rectus sheath. The oblique incision has of late years largely supplanted the vertical cut for appendicitis, because it avoids nerves, and because it goes through muscle instead of fibrous tissue, and thus leaves a strong scar. Furthermore, as McBurney has pointed out, in an acute suppurative case the appendix can be most easily found and exposed, septic fluids safely evacuated, and drainage best maintained by approaching the appendix from the outer side. If prolonged drainage is needed, there is less likelihood of subsequent hernia through an opening to the side than there is through an opening toward the middle line. Some surgeons make the incision by cutting through all the layers. Others follow McBurney, and separate the layers by blunt dissection. Whichever method is to be employed, the incision of the parts above the muscles is at right-angles to the line from the iliac spine to the umbilicus, and about 2 in. from the spine. In the cutting-operation the twelfth intercostal nerve, and even the iliohypogastric nerve, may be cut. With care, these nerves may be held out of the way; but a better way to avoid them is as follows: Cut the muscle-fibers among which the nerves lie a little more transversely than the line of the aponeurotic fibers of the external oblique, and thus incise in a direction more nearly parallel with the nerves. In McBurney's blunt dissection the nerves are not injured. The method of blunt dissection is usually limited to quiescent cases of appendicitis; but Stimson uses it also in suppurative cases, and in these occasionally associates with it a vertical incision external to the rectus muscle. Woolsey has had the best satisfaction with oblique incisions, and in suitable cases considers McBurney's method of blunt dissection the most ideal. The method of intermuscular separation may be employed if we desire to make temporary compression of the common iliac artery (McBurney) or to perform left inguinal colostomy (Pileher). Access to the kidney is readily obtained by a transverse incision below the last rib, prolonged, if necessary, to or even through the rectus. This incision is in line with skin-cleavage and with the last dorsal nerve. If more room is required König's incision is very useful, though, owing to the obliquely vertical posterior limb of this incision, there is danger of injuring nerves; hence it is advisable to round off the angle. [König found that the ordinary lumbar incision does not give ready access to the kidney, and devised the retroperitoneal lumbo-abdominal incision. Incise the soft parts vertically along the edge of the erector spinae mass and carry the incision to just above the iliac crest, curve it outward toward the umbilicus, and take it to or even through the rectus. In some cases the first cut is made oblique.] The biliary passages can be easily reached by a vertical incision at the outer border of the rectus plus a transverse incision of that muscle. This, however, is objectionable, because it cuts the eighth, ninth and tenth dorsal nerves. Czerny's method obviates this objection. In this method a vertical median incision is made plus a transverse cut at the level of the umbilicus. An oblique transverse incision below the costal margins gives excellent access to the subhepatic space, is in line with skin-cleavage and with nerves, and can be prolonged to or through the rectus. If more space is absolutely required, a vertical incision can be added in the semilunar line (Heineke). The majority of abdominal operations are done in the linea alba. This route is naturally chosen in most exploratory operations, in most gunshot-wounds, in operations on the pelvic viscera, and "in many other conditions." Woolsey has often wondered why so much stress is laid upon operation in the middle line. There is a possible reason for not opening the rectus sheath in suppurative conditions, but these constitute a minority of cases.

Ramsey has made this same inquiry. The reasons assigned for making the incision in the linea alba are: 1. Its slight vascularity. As Ramsey shows, slight vascularity is really an objection, as it makes a slowly healing wound and a distensible scar. 2. It contains few and unimportant structures. This reason is in reality an objection; it makes it difficult to gauge the depth of the incision, and in healing a thin scar will form because the fibrous layers cohere. 3. It gives ready access to the parts. But so does any other incision near to the median line. The median incision is objectionable because, if it becomes necessary to extend it, it may have to be taken around the umbilicus, a part which cannot be made surely aseptic. Ramsey employs a vertical incision through the middle of either rectus, and claims for it great advantages, which Woolsey considers real. Of course, if the incision is carried above the umbilicus the transverse striations are met with; but they require very little dissection and they do not extend to the transverse layer of the sheath. It is to be remembered that near the transverse line, at the level of the umbilicus and the transverse line above it, are the tenth and eighth intercostal nerves respectively. In order to avoid wounding these nerves do not go through the middle of the rectus, but near to the inner border, or employ the Jalgutier-Kammerer method. The incision through the rectus can even be employed in suppurative conditions, if the surgeon will suture together the two layers of the sheath on each side of the incision.

DISEASES OF THE RECTUM AND ANUS.

John Blake¹ writes on the **palliative treatment of anal fistula**. He states that the nonoperative treatment may be considered under the following heads: Cleanliness, dilatation of the external opening by means of gauze packing, the application of caustics, and the employment of a ligature. The elastic ligature is successful as a means of treatment for a straight sinus. Caustics are not reliable; but if one is used, pure carbolic acid is the best. Of the operative means of treatment, the one generally employed is incision followed by the use of packing, or excision with immediate suture of the tissues. The method most commonly followed is incision with packing. In most cases the sinus can be at least partly excised or scraped, and closed by buried sutures. This attempt at closure by buried sutures greatly shortens the time requisite for healing. After-treatment for a considerable time is necessary in order permanently to cure a fistula. [We are utterly opposed to the nonoperative treatment. In most cases we prefer to excise and suture. Some union takes place, and even a small amount of primary union lessens the period of confinement to bed. We have never seen **primary union** of the entire wound.]

George Boice Durrie² advocates the use of the **elastic ligature in the treatment of anal fistula**. This means of treatment is painless, and in order to apply it an anesthetic need not be administered. It causes no hemorrhage, and the patient can move around while the ligature is doing its work. Many patients will submit to be treated by ligature who would not allow an operation to be performed on them. If the fistula is not a deep one, a director with a probe-point is passed into the external orifice along the sinus and into the bowel. The point of the instrument is caught with the finger and is made to emerge from the anus; an eyed probe, armed with the ligature, is passed along the groove of the director, the probe and director are withdrawn and the ligature is left in place, and when it is tied all of the tissue can be con-

¹ Boston M. and S. Jour., Sept. 2, 1897.

² Med. Times, Oct., 1897.

stricted. If the fistula is deep and passes beneath the sphincter, the ligature cannot be inserted in the manner just advised. A long probe will be needed, and this probe must be bent so as to enable it to follow any particular deviating track. The elastic ligature which is used is round. It is applied as tightly as possible without causing pain, and the ends are passed through perforations in a pewter button and fastened by bending the button with forceps. The process of healing follows close upon the process of cutting, and when the ligature has cut its way out the wound is nearly healed. If a silk ligature is used, it has to be tightened every day. This is effected by tying a new ligature to the old one, drawing the new one in place and tightening it. It takes 2 weeks to complete the cure, the patient moving around during the entire course of treatment.

Matas¹ writes on **congenital anorectal imperforation**. He states that the commonest forms of imperforation and those which most imperatively demand surgical interference can be treated by way of the perineum. In very few cases is it justifiable to perform primary colostomy. The earlier an operation is performed the better. It is only in a pure membranous obstruction that it is proper to perform incision or puncture without proctoplasty. If, after a median incision in the perineum, exploration fails to reveal the rectum, the peritoneum should be opened and an intraperitoneal exploration be carried out. In cases where the rectum can only be found by intraperitoneal exploration the curative operation should be performed by the sacral route (a median incision being made through the cartilaginous coccyx and sacrum). If enough space is not afforded by central incision of the sacrum and coccyx, make an osteoplastic flap on each side. It is rarely necessary to perform a primary laparotomy for exploratory purposes. The artificial anus should be made in the perineosacral region. An anus in this region will be subsequently controllable. Inguinal colostomy should be performed only in those cases in which the child is rapidly failing from peritonitis or obstruction. If, after perineal exploration, it is found that the blind end cannot be brought down, median or lateral laparotomy should be performed.

Thomas Bryant² makes some very instructive remarks on **rectal surgery**. This article contains a number of valuable drawings made by the late Mr. Gowlland. Bryant says that anal and rectal cases are not, as a rule, well treated by the bulk of practitioners. Most patients come with a self-made diagnosis of piles, and the practitioner too often accepts the patient's diagnosis and fails to make an examination. A local examination should invariably be made. It need not be either painful or humiliating, and it should always be conducted decently. The patient should be placed upon the left side, with the thighs flexed. When the buttocks are separated the anus can be inspected. If the skin about the anus and anal fold is healthy, there is no pruritus or other external trouble. If the skin is inflamed or irritated, suspect local rectal trouble. If the anus is patulous, a rectal prolapse can be seen. If there is loose, redundant skin about the anus, there has probably been a prolapse of the rectum. If there is edematous or infiltrated redundant skin, there has been a rectal prolapse of hemorrhoidal or other structure, or there is disease of the lower rectum. If feces or discharge flow from the anus, suspect the possibility of rectal stricture or rectal ulceration. If the anus be drawn tight and looks like the apex of a cone, suspect an anal fissure or ulcer. If this constriction is increased by an attempt to separate the parts, and if at the dorsal or perineal end of the anus a skin-papilla is seen, the diagnosis of fissure is confirmed. An area of inflammation can be seen, and so can a true external

¹ Am. Jour. Obst., Dec., 1897.

² Lancet, Jan. 29, Feb. 12, Mar. 5, Apr. 2, 1898.

pile. All the above points can be determined by inspection and painless examination. To learn more, it will be necessary to introduce the finger or a speculum into the rectum. If an anal ulcer or fissure exists, further examination should be made under an anesthetic. Pruritus is not a disease *per se*; but is a symptom of local rectal trouble. It is present in cases of ascariides, and may exist in every variety of rectal trouble, as external and internal piles, polypi, ulcers of anus or rectum, and anal abscess. If none of these diseases exist, suspect an irritant rectal secretion with or without pelvic congestion, especially in women with uterine disorder. Stimulating articles of diet, beer, and spirits may cause it. Always seek for the cause of pruritus, and in only a few cases will it be impossible to find it. Many abscesses of the anus and rectum are unfortunately allowed to progress and are not incised, and in consequence develop into diffuse abscesses or fistulae with multiple openings. They should be opened as soon as the diagnosis is made; and if this is done, they will not become fistulae. In order to open a deep ischiorectal abscess, place the anesthetized patient upon his side, introduce an anointed finger into the rectum, with the finger press the abscess toward the perineum, and make a free incision into the abscess from the surface. Irrigate with an antiseptic and introduce a bit of gauze to secure drainage. Do not plug the cavity, as this will prevent the walls falling together. A small acute abscess of the anus will often produce severe pain in the part and also in the groin (the anus and the groin are joined by lymphatics). If an abscess has burrowed, the sinuses should be carefully followed up. Some of these cases of ischiorectal abscess result from ulceration of the rectum caused by foreign bodies, such as fish-bones (fecal abscesses due to extravasation).

"When an abscess has failed to heal and has passed into the condition of an anal, or of what I prefer to designate as 'rectal fistula,' a careful local examination should be carried out, although not before a full history of the case has been obtained. The surgeon should, with the patient placed on either his right or left side—the side selected being the one upon which the external orifice of the fistula is placed—begin his examination by carefully feeling the external parts for hardness, and when such is found to exist its extent and direction should be noted, particularly with reference to its relations with the external opening or openings of the fistula, for where any hardness is present it is probable that there either is or has been some inflammatory action, and under these circumstances that there may be present some branch-sinus, which, although not suggested by the external orifices of the fistula, has to be traced and laid open.

"The question of the existence or position of the internal orifice of the fistula into the bowel has next to be considered, and in the cases in which the patient states he has satisfied himself that wind passes through the external opening of the fistula the deduction is clear that an internal opening exists, although the precise seat of the orifice must still be obscure. To find the orifice of communication a carefully conducted local examination is essential. As a rule of practice, it is generally well for the surgeon to pass his probe-pointed director through the external fistulous opening before he passes his finger into the bowel, for in passing his finger, however gentle the surgeon may be, some spasm of the anal sphincter must occur, and in that way a difficulty is made to the passage of the instrument by the muscle throwing the sinus out of a right line. No force should be used in passing the probe, and should an obstruction be met with it would be well to remove the probe and give it a bend with the concavity upward, the bend tilting the end of the probe upward against the bowel. When the probe has passed its supposed course the surgeon should

then introduce his finger, and thus determine the point he wishes to elucidate. He has also, if there are many external sinuses, to find out whether each one has its own internal opening, or whether there may be only one common opening, the more usual condition. He has likewise to satisfy himself whether the sinus which communicates with the bowel ends at the internal opening or passes up beyond, and, if so, how far. He should also examine the soft parts around the external opening or openings, so as to be sure that they are not undermined or the seat of other lateral sinuses, for in the treatment of a fistula every sinus should be found and, as a rule, laid open, branching sinuses, or what have been described as T-sinuses, always requiring this treatment.



FIG. 38.—Diagram representing a case of blind internal fistula: *a*, seat of external abscess where opened.

“The internal orifice of the fistula should always be made out, and with care it can generally be detected. It feels, with the surgeon’s finger in the rectum, when recent, like a depression in the walls of the bowel, and when of long standing more or less indurated. In exceptional cases the walls of the rectum may be extensively ulcerated, and under such circumstances the internal orifice of a rectal fistula will be difficult

to recognize by the sense of touch. At times the internal opening is so large as to admit the tip of the finger; under these conditions previous ulceration has doubtless been present and has been the cause of the fistula or fistulæ, for where a large abscess has been the result of rectal ulceration several external openings about the anus are usually present. Injecting the external fistula with milk or some colored liquid will often help in detecting the presence or position of an internal opening.

“As a rule, the division of a rectal fistula when well performed is a successful measure, and where failure follows it is as often due to the presence of constitutional causes as of local. The former may be difficult to overcome. The latter are mostly in the surgeon’s power to control. Thus, failure at times follows an operation when the surgeon has not found the internal aperture of the fistula, and has thus left a sinus extending above the internal opening, which for a successful result should have been laid open. Failure likewise may follow any operative measure when an external sinus has been overlooked or not laid open, whether branch-sinus or otherwise. It should also be pointed out that failure at times follows operation when the surgeon has been satisfied by dividing the sphincter and laying open a single sinus, but has omitted to cut away overlapping edges of skin or scrape away old sinus-tissue, particularly in tuberculous subjects. Failure also is sure to follow where the fistula is the secondary effect of some rectal disease, such as extensive ulceration or any stricture of the bowel. In treating a blind internal fistula it is, as a rule, expedient to open first the abscess situated at the lower or perineal end of the sinus, and subsequently to divide the external sphincter with the sinus-channel.

“In dressing a fistula after operation there is no need after the first dressing for any daily plugging of the wounds. Such wounds must, of course, be kept clean; but dressings are only needed to keep the edges of the skin-wound from healing too rapidly before the deeper parts have filled up. Careful paring of the overlapping and undermined skin renders this old practice now unnecessary. The bowels should be kept open and the motion soft, not loose

—for liquid stools are apt to excoriate, and always give more local pain to wounds about the anus than do soft, pultaceous motions.”

The author then discusses **ulcers and fissures of the rectum**. A fissure can be readily cured, if uncomplicated, by forcible dilatation, followed by incision through the center of the floor-ulcer, together with $\frac{1}{2}$ in. of the healthy tissue above and below it. This incision passes through some of the superficial fibers of the sphincter muscle. If the ulcer has been of long standing the incision must be made deeper than if the ulcer is of recent origin; but in an uncomplicated case it is never necessary to divide the entire sphincter. The author then presents the subject of hemorrhoids in a most instructive manner. He tells us that purgative medicine for hemorrhoids should never be powerful. Diet is of the first importance. It is never proper to use brown meats, such as beef and mutton, too freely, especially if the individual doing so takes an insufficient amount of exercise. Even then the patient should be more free with fish and birds than with beef and mutton. Well-cooked vegetables are of advantage. Much potato is not advisable, and freedom with alcoholic liquors is to be condemned. People who have had hemorrhoids for years not unusually ward off surgical procedures for a long period or indefinitely simply by the observance of rules of diet. In speaking of the **treatment of external hemorrhoids**, he states that the loose fold of skin which so often goes by this name need not be interfered with, unless it ulcerates or a fissure takes place between the folds. If such a complication occurs the sphincter should be stretched and the fold of skin cut off, the line of incision radiating from the anus and the margins being stretched. If a varicose vein be noticed externally, the administration of a dose of castor oil, and a day or two of rest, will usually bring about a cure; but if the vein be thrombosed, it must be laid open and the clot turned out. For an internal hemorrhoid that does not protrude or prolapse, and only bleeds at long intervals, surgical treatment is not necessary; but should the hemorrhoid protrude somewhat, operation should be practised for its cure. In some early cases simple dilatation will cure. When a hemorrhoid is large or there is more than one, and these are of long standing, simple dilatation will not cure. The author prefers the treatment by means of a ligature. He has entirely given up the operation of crushing, and he thinks that the injection of dilute carbolic acid is satisfactory only in very exceptional cases. When internal hemorrhoids are prolapsed and extrude the surgeon has a difficult task to deal with. If the strangulation is recent and of moderate size and the parts edematous and inflamed, an attempt at reduction will fail and the protrusion will inevitably recur. Such cases should be left alone, lead-water and laudanum being applied to the part; although in some cases the surgeon may give ether, stretch the sphincter, and reduce the hemorrhoid. The author then discusses prolapsus ani and villous growths of the rectum. The article is of great practical value.

Joseph D. Bryant¹ writes upon **colopexy for prolapsus of the rectum**. This operation was first performed by Jaennel, in 1889. Jaennel opened the abdomen in the iliac region, drew the intestine out of the wound in order to reduce the prolapse, stitched the bowel to the borders of the wound, and supported it by a steel sound, wrapped with gauze, carried through the mesentery and permitted to lie within the abdomen. On the sixth day an artificial anus was made to secure quietude of the rectum. About a year after the operation the artificial anus was closed. The result in this case was satisfactory. Nine months after Jaennel's case Verneuil performed the operation. He fastened the bowel in place by sewing the appendices epiploici into the wound. The appen-

¹ Ann. of Surg., Aug., 1897.

dices were not strong enough to sustain the parts, and though the condition was much improved it was not cured. In 1890 McLeod, of Calcutta, operated as follows: He introduced a hand into the rectum, carried up the prolapsed part to 2 in. above Poupart's ligament, and fastened the bowel to the abdominal wall by transfixion with pins; between these pins an incision was made down to the peritoneum. The anterior wall of the bowel and the parietal peritoneum were carried into the cut in the belly-wall and were stitched to each other and to the sides of the incision. This case was cured. Bryant's case, in 1893, presented a prolapse 4 in. in length, which had been operated upon several times without success. An artificial anus was created. This produced great temporary improvement, but as the artificial anus gradually diminished in size the prolapse gradually returned after 2 years. Colopecty was performed. The small artificial anus was closed with inversion-sutures. An incision parallel with Poupart's ligament was made through the peritoneum. The peritoneum was stripped for at least 1 in. from the tissues on each side. The gut was drawn upward and fastened to the peritoneum by silk sutures, the sutures passing through the muscular coat of the intestine. Six silk sutures were passed through the edges of the abdominal wound, were made to include the muscular coat of the bowel behind the longitudinal band, the band was drawn well into the wound, and the sutures were tied. This patient was cured.

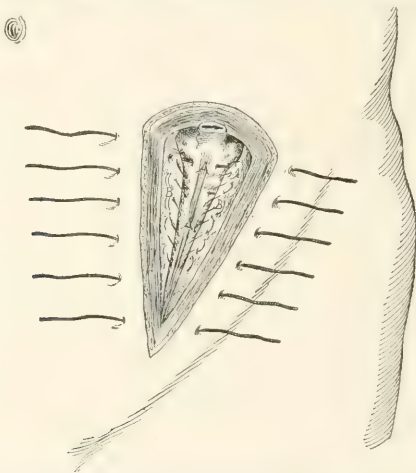


FIG. 39.—The operation of colopecty: *A*, *A*, longitudinal band, with sutures passed behind it, including peritoneal and muscular coats of the intestines, drawn forward; *B*, *B*, parietal peritoneum quilted to sides of the intestine, showing stitches; *C*, old fecal fistula (Bryant, in *Ann. of Surg.*).

Of 29 reported cases of colopecty there was nonrecurrence in 22, partial recurrence in 3, and recurrence in 4. Not a single death occurred.

Doumer¹ treats painful **fissure of the anus** by introducing an electrode through the sphincter muscle and applying a rapidly interrupted current. He states that the same method of treatment benefits hemorrhoids and the tags that result from external hemorrhoids.

¹ *Le Scalpel*, Oct. 31, 1897.

Talley¹ writes on **chronic proctitis**. There are 2 varieties of the non-specific disease: First, a form in which there is a broadly diffused inflammation accompanied by superficial ulceration and the growth of papillomatous vegetations. Second, cases in which the submucous tissue is hypertrophied, and as a result of this proliferation stenosis of the rectum arises. The second condition may follow the first, and in any case both conditions may be met with. Ulcerations from this disease are usually low down. Ulcers are very apt to arise if an acute inflammation attacks a chronically-congested rectum. In this form of proctitis there are some tenesmus and the passage frequently of stools containing mucus and occasionally blood. In some cases a large quantity of blood is constantly found in the discharges. It occasionally happens that the relaxation of the sphincters is so marked that there is fecal incontinence. There will be very little pain unless the mucous membrane which is in the sphincter-region is involved; but in all cases there is rectal discomfort. If a digital examination is made, ulcers will be found if they are situated low in the rectum. Most ulcers are situated within reach of the finger, but not all; and the entire rectum should be examined by means of the proctoscope. In treating this condition rest in recumbency is of the first importance. The diet must be nutritious, liquid, and easily digestible. In most cases the sphincter should be dilated, and after this dilatation the rectum is inspected, and any ulcers found are touched with silver-nitrate solution of the strength of 40 to 60 gr. to the oz. If there is no ulceration, but a diffuse chronic inflammation, the mucous membrane should be mopped with silver or copper of the strength of 30 gr. to the oz. The after-treatment consists of rest in bed, daily irrigations with warm boric-acid solution, and the use of suppositories of iodoform and boric acid. An injection which gives much comfort is 7 gr. of iodoform to the oz. of sweet oil, $\frac{1}{2}$ oz. being injected at bedtime. If the case is very chronic and the ulcer is very indolent, it should be touched with the solid stick of silver, and a number of applications may be necessary. Some authors state that chronic proctitis is never met with in children; but Talley disagrees with this, and cites a case in which it did exist. If the ulcer is exceedingly sluggish, scarification or curetting is advantageous. If much pain exists it is useless to rely upon enemata of starch-water; but the surgeon should stretch the sphincter-muscle in order promptly to relieve it. In very severe cases, when the treatment outlined above has not produced cure, and if a small area only is involved, it may be excised, the healthy mucous membrane being brought down to the skin, as in Whitehead's operation for piles. Vegetations should be destroyed by the use of chromic acid or the Paquelin cautery. If they are high up and cannot be reached from below, some authorities assert that we should split the rectum and anus posteriorly through the median line to the coccyx, to gain access to the trouble; but the author maintains that all cases can be treated through the proctoscope, unless there be a tumor of considerable size. When stenosis of the rectum occurs the normal rectal structures fuse together, the glands atrophy, and the epithelium undergoes changes. It happens sometimes that the perirectal tissues become involved. The trouble rarely extends higher than 2 or 3 in. above the sphincter, and, as a rule, there is but one point of severe constriction. Ulcers may be noted above and below the constriction. The opening of the stricture does not close entirely, although it may become very small. This condition probably results from the infection of ulcers. In some of these cases there is a history of specific disease, but the author has never been able in any case with such a history to cause the disappearance of inflammatory material by anti-

¹ Mathew's Quart. Jour., Jan., 1898.

syphilitic treatment. Even a syphilitic ulcer acts simply by permitting infection of the deeper layers of the rectum. A thickening of a rectal ulcer from tubercle is generally accompanied by very extensive ulceration and the evidence of tubercle in other portions of the body. If the patient suffers from this condition there will be increasing difficulty in defecation. In the morning the desire will be urgent, but the patient will strain and accomplish very little, and after the movement the relief will be but slight. Little, hard masses of feces are frequently passed, or they may be lead-pencil or tape-like in shape. In such a condition blocking easily occurs. Tactile examination makes the condition clear. Cancer can be eliminated by the history of the case. The stricture which results from the healing of an ulcer is irregular; whereas the finger in a case of stenosing proctitis recognizes a widespread thickening of the walls of the rectum, with a marked constriction. This form of disease never gets well of itself and is never cured by medicine. The palliative treatment which affords some relief is dilatation by bougies. The Wales bougie is the best form. It is hollow, and water may pass through it while it is being injected, the stream of water serving to throw the mucous folds out of the way and prevent the instrument catching in them. A bougie should not be passed oftener than every fifth or sixth day. If the stricture is very tense, internal proctotomy should be performed, followed by dilatation. This operation is safe if the stricture is within 2 in. of the sphincter muscle. After the proctotomy and dilatation it is well to pass bougies at intervals to prevent recurrence.

Straus¹ writes upon **primary tuberculosis of the rectum**. He tells us that a diagnosis simply made from the clinical symptoms is not reliable, and that in very severe cases the bacilli should be carefully sought for. He reports 4 cases in which this proceeding was carried out. Rectal tuberculosis is as truly a surgical disease as appendicitis; it cannot be diagnosed simply by clinical symptoms; the only correct way of making the diagnosis is by the employment of a microscope; the use of the curet or the operation of excision, or the employment of both methods with the cautery, may cure, and even a hopeless case may occasionally be cured by several operations; every suspicious case should be examined for bacilli; a permanent cure of such cases can only be brought about by absolute destruction of the diseased tissue which is the abiding-place of the bacilli; sufficient time has elapsed after the treatment of a reported case to show that they remain cured; operation should be done early on such case, and should be unhesitatingly repeated, if necessary.

Mathews² considers Mathews's versus Kelly's method of dealing with **disease of the sigmoid flexure**. He opposes Kelly's method and thinks it is dangerous. The rectum is not a straight tube, but is curved, and has danger-signals, as the vagina, uterus, bladder, peritoneum, etc. Four inches of it are attached; 6 or 8 inches are movable. It contains extensive folds, and force is often necessary to push them out of the way. At the entrance of the sigmoid flexure is a mass of muscular fibers which has been called the third sphincter, and this is often a dangerous obstruction to the Kelly speculum. The mesorectum passes down in front of the rectum to within 3 or 3½ in. of the anus. The fold of peritoneum of the flexure is not sufficiently long to allow the gut to hang over the brim of the pelvic cavity. At the lower end of the flexure the fold is short and holds the part close up to the sacroiliac symphysis. It is thus seen that when the sigmoid flexure is not distended it hangs down in the pelvis like a bag. Even in health it would be difficult, not to say dangerous, to pass a large metallic tube through the

¹ Mathew's Quart. Jour., Jan., 1898.

² Med. Age, Apr. 11, 1898.

rectum, and the difficulties and dangers are much increased if the tube be diseased. It will be remembered that a surgeon a short time ago reported a case in which Kelly's instrument penetrated the pelvic cavity while being introduced into the flexure. Mathews believes Kelly's instrument is without utility. At one time it is possible through this tube to observe a space only $\frac{1}{2}$ in. in diameter. The reflection from the head-mirror is obscure and the observation cannot be accurate. Benign ulcers of the character said to be detected by the use of this instrument are rarely present, although abrasions or excoriations often take place on mucous surfaces; but abrasions or excoriations take place on mucous surfaces which are due to the peeling off of epithelium. This is a very different condition from ulceration, which is a destruction of tissue by a necrotic process. This being true, any effort to find a well-marked ulcer in the sigmoid flexure will be futile. Of course, an ulceration arising from a special cachexia, such as cancer or syphilis, or tubercle, may exist in the colon; but in such a case its presence will be indicated by clinical symptoms, and no one would think of introducing a hard-metal tube under such conditions. Another objection to the Kelly instrument is that it is advisable to give ether or chloroform when it is used. No one takes either of these agents without fear, and in giving ether there is some risk, and the little good to be accomplished is not sufficient justification for the procedure. Instead of the unsatisfactory and dangerous method advised by Kelly, Mathews suggests the following simple plan: The instruments to be used are a soft-rubber flexible Wales bougie and an ordinary bulb-syringe. The bougie can be passed with perfect safety by an attendant or nurse, and by means of these instruments we can treat without danger every inflammation or so-called ulceration of the sigmoid flexure. The question might be asked, How are we to know that an ulceration exists in the flexure without seeing it? By pain over the seat of the flexure, frequent discharges of mucus or mucopurulent matter, and the absence of disease in the rectum, the reflex indications which always accompany such a condition. The agents which Mathews commonly uses are silver nitrate, boric acid, *Pinus canadensis*, fluid hydrastis, or copious irrigation with pure hot water. By this plan Mathews says that the necessity for Kelly's instrument is reduced to a minimum, if, indeed, it should ever be used at all.

T. Pridgin Teale,¹ under the title "Detail in Surgery," discusses **operations for hemorrhoids**. The operation which he now prefers is as follows: He uses ether instead of chloroform; he places the patient in the lithotomy-position, and keeps him in it by manacles and Clover's crutch. He dilates the sphincter, thus bringing the hemorrhoids into view and preventing future spasmodic disturbances. He grasps the most prominent hemorrhoid at each extremity by a volsella forceps and holds it during the operation, thus obtaining perfect command during excision and suture. He excises the hemorrhoid with curved scissors, marking out and partly dissecting a shallow flap, first on the mucous-membrane side and then on the cutaneous side. He next excises the hemorrhoidal mass, ties any pulsating vessels, and brings the two sides of the cut together by a continuous suture, commencing the suture about $\frac{1}{2}$ in. from one end, passing it rather deeply so as to bring the whole surface of the wound together and to control oozing, and terminating the suture about $\frac{1}{2}$ in. from the other end. The suture is of catgut, and is secured temporarily by clip-forceps. He deals with other hemorrhoids in the same manner, leaving $\frac{1}{2}$ in. of tissue between each wound. Finally he removes the clips, ties the sutures and cuts them, leaving about 1 in. protruding at either end. The sutures, as a rule, disappear; but if they do not, they can be pulled out with-

¹ Lancet, May 7, 1898.

out difficultly at the end of a few days. The after-dressing consists simply in some cotton-wool placed between the buttocks to absorb any oozing of blood or serum, but no lint or other dressing is introduced into the anus.

Earle¹ has devised a **substitute for Whitehead's operation for hemorrhoids**. It is performed on those individuals who have a complete ring of internal and external hemorrhoids. Each internal hemorrhoid is grasped between 2 clamp-forceps. The pile is divided between the forceps and the wound closed by a continuous catgut suture, the suture being passed over and under the clamp-forceps, leaving the thread loose, so that the clamp may be withdrawn; and when this has been accomplished the suture is tightened and tied. When the internal hemorrhoids have all been removed a skin-cut is made on the right and left of the anus, parallel to the margins of the anus and over the dilated subcutaneous veins. This incision must not cross the inferior or posterior commissure. The skin is dissected back and the veins are exposed, ligated, and cut away posteriorly, the superfluous skin is removed, and the edges sutured with catgut suture. The author claims that this method possesses all of the advantages and none of the disadvantages of Whitehead's operation.

Quém² and Hartmann² discuss indications for **operation and treatment of cancer of the rectum**. They say it is absolutely necessary to have free and easy access to the rectum; that it is most essential to maintain asepsis; that the surgeon should never put his finger up the rectum during the operation, even though the intestine has been previously divided, but the rectum should be taken out as if it were a bag containing septic material. This can be accomplished by the methods the Germans follow—that is, by placing an elastic ligature above and one below the portion to be extirpated. The authors advise making a circular incision around the anus, sewing up, and cauterizing with the actual cautery; and they particularly caution us to avoid pulling strongly on the rectum, as cancerous tissue tears very easily. In the rectosigmoid growth they advise sewing up the anus and doing an abdominal section, and then freeing the rectum, drawing it up out of the abdominal wound, and establishing an artificial anus there. They classify cancers of the rectum as follows:

Cancers.	Rectal, properly speaking.	Rectosigmoid.		
		Cancer limited to one portion of the rectum.	Total, or extending throughout the rectum.	
			Cancers low down.	Anal cancers.
				Cancers of anus and distended portion of the rectum.
			Cancers extending above the distended portion of the rectum.	
			Cancers of the middle of the distended portion of the rectum.	Total.
Partial.				

Quém³ presents a study of cancer of the rectum. He states that in this region the onset of cancer is generally very insidious, and the disease has often progressed to a great degree before symptoms have been noted. In fact, an

¹ Va. Med. Semi-monthly, Oct. 8, 1897.

² Gaz. hebdom. de Méd. et de Chir., Oct. 24, 1897.

³ Rev. de Chir., Aug., 1897.

epithelioma of the rectum may advance to a considerable degree before there is any interference with the general health. Pain may be entirely absent, or there may be merely that feeling of weight in the sacral region of which the victims of constipation so frequently complain. Among the early symptoms which should direct the attention of the surgeon to this region may be mentioned hemorrhage, which occurs in a certain number of cases. In others there is failure of the general health; in others certain morbid sensations. It may happen that the hemorrhage occurs suddenly and in quite a large quantity after a bowel-movement. The author reports 4 cases of this description. Several hemorrhages may occur during a day, or there may be but one hemorrhage. The occurrence of a large hemorrhage in the very beginning of a case is difficult of explanation. We would expect a large hemorrhage to occur during the ulcerative stage; but in this early period of cancer it must usually be due to venous obstruction. It is rare, however, that the early hemorrhage is copious, and hemorrhage when it first appears is generally only a few drops of blood accompanying a bowel-movement. The blood, as a rule, is red; but if the hemorrhage has taken place very slowly and the blood has lain for a time in the rectum, it may be black. The abnormal sensations occasionally met with early in cases of cancer of the rectum may consist of abdominal uneasiness, fugitive, not localized, abdominal or colicky pains, and occasionally pains in the region of the disease. Some victims of cancer have no pain or trouble except during defecation or immediately afterward. The majority of victims of this disease have a feeling of weight in the sacrum or coccyx and frequent desire to defecate, and a tendency at stool to pass only a little gas or mucus; exceptionally, diarrhea is the first symptom. Loose stools following an interval of 2, 3, or 4 days of complete constipation are not infrequent. If these symptoms are noted in a patient over 45 years of age, especially if he is losing strength, color, and weight, the rectum should at once be investigated. If we follow this advice we will be able to make a diagnosis far earlier than is usually accomplished.

Joseph M. Mathews¹ discusses **extirpation of the rectum**, and considers what rectums should be extirpated. He opposes Kraske's method of extirpation. It is not a question whether the entire rectum can be removed, but whether it is advisable to remove it. The disease for which this operation is chiefly practised is cancer. Most writers have been negligent in stating the exact length of time that a patient lives. Olshausen says that vaginal carcinoma does not offer a favorable prognosis; recurrence takes place early. Of 16 cases, 15 relapsed; in the sixteenth case the disease has not recurred in 2 years. In rectal carcinoma of the female the vagina is often involved. Paul says that excision of the entire rectum has not met with strong favor among English surgeons. Cripps disapproves of the major operation. Treves does not consider it justifiable to remove more than 3 in., and opposes the opening of the peritoneum. Jacobson condemns the high operation. Taylor looks with some favor upon the major operation. The mortality of excision varies from 20% to 25%. Taylor asserts that even if a very small percentage of radical cures can be obtained, it is better to give the patient this chance than to let him die miserably of the disease. Mathews says there are two objections to this treatment: First, there is a large percentage which die as a result of the operation; second, many of these cases of cancer are not so distressing as they have been pictured, and if the sphincter muscles are not involved the patient may suffer but little pain. The surgeon rarely sees these cases early. The best time for excision is in the early stages. If the rectum is affected with epithelioma at its lower margin, such a case should be operated on; but such

¹ Physician and Surgeon, June, 1898.

cases are rare. Cancers of the upper rectum usually take origin in the sigmoid flexure and extend downward. It has been said that an operation must be done when there is dangerous hemorrhage; if total destruction exists or is taking place; if there is great pain; and to prevent further extension of the disease and effect a cure.

Mathews has never had occasion to operate because of dangerous hemorrhages, because he could always control the bleeding without radical operation. Of course, if there be such a dangerous symptom, and it cannot be stopped by other means, a radical operation would be justifiable. If occlusion seems to be taking place it is not necessary to extirpate, but it is necessary to relieve the strictured condition. Procedures much simpler and less dangerous than extirpation will accomplish this result. In regard to curetting to prevent great pain, it depends upon the cause of the pain and whether an operation would relieve it. Pain in malignant disease is often inherent, caused by involvement of nerves in pathologic tissue; and if this condition exists to a great degree it calls for extirpation rather than colostomy. If pain is caused by the passage of feces, then colostomy is preferable to extirpation; but in many cases of cancer, especially if the growth does not involve the sphincters, pain is not a factor. In regard to operating to prevent extension of the disease and effect a cure, if such a result can be obtained, the surgeon should seek to accomplish it. It has been stated that we should operate in an early stage, when it is possible to remove all involved tissue. This is undoubtedly sound; but shall we operate after the early stage? Mathews emphatically says No. When the rectum is extirpated we know that a considerable percentage of cases die as a result of the operation. Some live 1, 2, 3, or perhaps 6 years; but would they not have lived as long without operation? Many do so. It may be maintained that they live in greater ease after the operation; but some do not. If for the relief of pain only, morphin would have accomplished as much. There is no question that when constitutional symptoms are manifest, or when by the infiltrating processes the adjacent organs and tissues are invaded, extirpation is unjustifiable. Mathews considers the operation of Kraske dangerous and difficult, and says that it promises us so little and causes the patient to go through so much, that it is better to comfort his life than to endanger it. For the treatment of cancer of the rectum a number of plans have been advocated: First, caustics, including the thermocautery; second, colostomy; third, curetment; fourth, extirpation by the Kraske method; fifth, removal by the circular method; sixth, palliation and division of the coincident strictures. The first is of little use; the second is the subject of much argument. In the majority of instances the writer does not perform it. He fails to see any advantage that curetment possesses over extirpation, and it certainly accomplishes less. The chief reason the writer opposes Kraske's method is because of its difficulties and dangers, and because by a simpler and safer method the entire rectum can be extirpated, if it is deemed advisable. The circular method is simple and easy; and if there is any want of room, the removal of the coccyx will give ample space. The sacrum should be left in place. Palliation can be sought for, and pain may be rendered bearable by opium. Mathews dilates strictures by the use of a dilator, and does not subsequently use any bougies. After the dilatation he plugs to prevent hemorrhage. The frequent use of bougies accomplishes very little, and the friction caused by them leads to additional deposit, especially in syphilitic or benign strictures. [Many eminent surgeons think highly of excision by the method of Kraske. During the last 7 years Kraske has operated upon 51 cases, with 5 deaths, a mortality of less than 10%. During the preceding 7 years it was 34%. This is an

operation which is very difficult when a surgeon first performs; it but the greater his experience the easier it becomes, the more rapidly he does it, and the less the mortality. Kraske never performs the osteoplastic operation, because he considers it unnecessary, believing, as he does, that removal of the bone does not permit prolapse of the pelvic organs. He does not suture the wound, but packs it with gauze. Many cases can be attacked by this method, with some hope of success, which are absolutely beyond the reach of any other operation. The operations upon these advanced cases cause the mortality to be rated as high, but the mortality really depends upon the nature of the case. Czerny reports a mortality for Kraske's operation of 13.64%, and states that after it there is much less tendency to recurrence than after perineal excision, because diseased structures and lymphatics can be removed with much greater thoroughness.]

A. T. Cabot¹ makes some observations on **malignant adenoma of the rectum**. He states that in malignant disease the proper period for operation has generally gone by when the surgeon first sees the case. The early stages of rectal cancer are painless, and during this period the lymphatics are infected and it becomes hopeless to attempt to obtain a radical cure. Since Kraske's paper, in 1885, the technic has been so much improved that the removal of a growth in the lower bowel is no longer very difficult or dangerous; but even with this radical and exact method we can accomplish a cure only if the growth is recognized early. Most rectal carcinomata, except the marginal epitheliomata, have a glandular character, and are to be considered as adenocarcinomata. The exact relation between the true adenoma, in which the epithelium remains limited by a basement-membrane, and the adenocarcinoma, in which the epithelium has broken through that membrane and invaded the tissues outside of it, has never been clearly shown. We have no positive facts to show that carcinomata begin as adenomata; but the fact that some tumors having the histologic character of adenoma contain small areas showing cancerous change lends support to the above opinion. A true adenoma is a small growth, and a large growth of an adenomatous nature almost always has positive cancerous characteristics. The best working hypothesis is that a certain number of these adenocarcinomata have a stage during which they are benign, and even in some of those which rapidly show carcinomatous characteristics there is probably an appreciable time after the epithelium breaks through the basement-membrane before the lymphatic channels carry the cells any distance from the original growth. Cabot inquires, What are the distinct characteristics by which we recognize these growths early? They may be considered as pedunculated or flat, sessile tumors. A pedunculated tumor is readily recognized by the finger. It can be distinguished from a fibrous polyp by its situation, the polyp being situated just inside the anus, while the adenomatous polyp has its seat higher up in the rectum. Adenomata have a rougher surface than the fibrous tumors. When they attain a little size they have a feel and form which we characterize as cauliflower. The sessile growths start as slight elevations on the rectal wall, and as they enlarge become nodular. They cause very little trouble, and the chance of discovering one early is slight. Their usual seat is in the upper part of the rectum, and they are often missed by the examining-finger. The first symptom of these adenomatous tumors is hemorrhage, and this is usually accompanied by a feeling of irritation in the rectum. In a recent case in which a cancer of the entire rectum existed, the first hemorrhage had been noticed 5 years before, and had persisted in moderate quantities for 3 years before the patient sought advice; the surgeon who examined

¹ Boston M. and S. Jour., June 9, 1898.

him then discovered a tumor high up, which he could barely reach with his finger. Two years later the entire rectum was involved in a hard nodular mass. The patient usually considers the hemorrhage to be due to hemorrhoids. If the stools are examined at the time when the hemorrhage first appears, they will usually be found to contain mucus streaked with blood. The author reports a case which exhibits the clinical phenomena which he has just set forth. In this case Cabot made an incision over the left side of the sacrum. The posterior edge of the sacrum was removed and an opening was made through the posterior rectal wall. Through this opening a tumor as large as an English walnut was pulled out. It was attached to the anterior wall of the rectum, and that portion of the anterior wall was pulled through the posterior opening with the tumor. The growth did not seem to invade the mucous membrane about it. The pedicle and adjacent rectal wall were cut out, the wall of the rectum sewed with catgut stitches as it was cut, the posterior opening in the rectum was stitched, and the patient made a good recovery. The growth was an adenoma. The author reports a second case, in which the diagnosis was adenocarcinoma. An incision was made along the left border of the sacrum to just below the tip of the coccyx. The coccyx and the left part of the sacrum, as high as the third foramen, were cut away with bone-forceps. An opening was made in the posterior wall of the rectum high up. The growth could be drawn into the opening, but could not be made to emerge. An attempt was made to cut bit by bit through the attachment of the growth, stitching the rectal wall as it was cut, but this attempt was abandoned because of inaccessibility. The growth was cut away with the margin of rectal wall around it. As the tumor was situated upon the wall of the rectum which was covered by peritoneum, an opening was of course made into the peritoneal cavity. An effort was made to close this, but accurate closure was impossible. The question was how to prevent the contents of the bowel from escaping into the peritoneal cavity. Fortunately, the rectum had been cleaned carefully before operation. Cabot took a deep stitch through the rectal wall, just above the opening left by the removal of the growth, and drew the rectum down to the lower edge of the posterior opening of the bowel and attached it to the skin. In this way the opening in the anterior wall of the bowel was drawn below the posterior opening, so that the feces could escape posteriorly without reaching the opening into the peritoneal cavity. The incision into the peritoneal cavity was packed with iodoform-gauze. This arrangement worked most satisfactorily. At the end of 3 days the stitch holding the anterior wall was cut and this portion of bowel was allowed to resume its normal position. During the next few days the gauze was gradually removed; but it took about 50 days for the opening in the anterior rectal wall to completely close. About 2 months after the first operation the opening posteriorly in the rectum was refreshed and closed by buried catgut stitches, the skin being brought over it with silkworm-gut stitches. Healing was obtained by first intention.

Heydenreich¹ has twice practised **excision of the rectum through the vagina**. He incised the posterior vaginal wall in the median line, cut the anterior portion of the peritoneum, and carried the incision all around the anus. One incision was carried from the posterior part of this cut down to the coccyx. By this method he formed 2 vaginal flaps and 2 posterior flaps. The rectum was drawn down and excised, a healthy margin was sutured to the skin, and the incision was closed. He holds that division of the vagina greatly facilitates resection of the rectum, and thinks that it is indicated not only in cancer involving the anus, but in lesions high up. It

¹ Sem. m  d., Sept. 17, 1897.

should not be used when the anterior wall is implicated at the point of division, but when the neoplasm does not reach higher than 12 or 15 cm. above the anus. By this method infiltrated glands can be reached, and hemorrhage is small and easily controlled. The operation is much briefer than is Kraske's and produces much less shock, and the surgeon avoids the danger of producing fistula and incontinence of feces, and does not destroy the firmness of the bony pelvis.

R. Belin¹ writes on **iliac colostomy** in the radical cure of rectal cancer. He thinks that this operation is of very great advantage if performed before the radical operation. An artificial anus is more conveniently placed in the iliac region than in the sacral region. The existence of this artificial outlet antagonizes recurrence and prevents infection of the area of excision. It is quite true that many surgeons condemn it. One case is on record in which, after a colostomy had been made, Kraske's excision was immediately performed, the time occupied by the completed operation being 2 hours and 25 minutes.

Czerny² writes on **malignant stricture of the rectum**, considering 109 cases of excision which he has performed; 99 of these patients left the hospital apparently well. In 12 of these there have been no recurrence in 2 years; in 21 no recurrence in 3 years; in 15 no recurrence in over 3 years and under 4; in 13 no recurrence for 4 years; and in 8 no recurrence for 5 years. Czerny says that it is the duty of the surgeon to make an early diagnosis and to extend the field of operation by improving the technic. He has performed the Kraske operation 66 times, with 9 deaths. The tendency to recurrence after Kraske's operation is by no means so strong as after perineal excision, because it gives the surgeon more room to remove infected structures. He thinks that from 20% to 25% of cases subjected to Kraske's operation remain free from the disease for 2 years at least, and that the greater proportion of these apparent cures are permanent cures. Czerny tells us that the sacrum should not be too heroically removed, for he has on two occasions seen serious harm result to the bladder from removal of the third sacral vertebra. In a male with a high rectal cancer removal of a part of the sacrum may not give the surgeon enough room, and in such case it is necessary to combine laparotomy, as advocated by Maunsell, Sonnenberg, Trendelenburg, and others. The author believes in colostomy in inoperable cases or in cases in which the obstruction is very great.

DISEASES OF THE RESPIRATORY ORGANS.

A. R. Létiévant³ writes on **transhyoidean pharyngotomy**. The operation was first performed by Vallas, in 1895, for a tumor of the epiglottis. Since then the procedure has been applied to varying conditions: goiter of Bochdalek's canal, specific stricture of the lower part of the pharynx, and new growths of the tongue. The author thinks that this operation has certain notable advantages. A preliminary tracheotomy is not necessary. He usually administers a general anesthetic, but in case of stricture of the pharynx he has used cocaine. The operation is performed as follows: The skin is incised in the median line over a point about a finger's breadth above the hyoid bone to a point some distance below it. It may be necessary subsequently to extend this incision. The periosteum of the hyoid bone is divided and pushed off, and the bone is divided in the median line. The muscles are separated, and the

¹ Progrès méd., Oct. 2, 1897.

² Berlin. klin. Woch., Sept. 6, 1897.

³ Gaz. des Hôp., No. 110, 1897.

surgeon can effect an entrance into the pharynx either at the level of the epiglottis or upward into the thickness of the tongue. The future proceeding varies according to the condition for which we are operating. If dealing with a stricture of the pharynx, the finger should be passed down the pharynx and the stricture be divided upon the finger. If the tongue is to be amputated, both lingual arteries are to be tied; the hyoid bone is divided as before mentioned. The buccal mucous membrane is divided along the inner surface of the lower jaw; the attachments of the tongue to the floor of the mouth and the lateral process of the mouth are cut with scissors; forceps are introduced through the pharyngotomy-wound. The tip of the tongue is grasped and pulled outside of the hyoglossus, and the rest of the base of the tongue is cut off with scissors. Some surgeons suture the hyoid bone; others consider that it is unnecessary. This operation would be of value in the removal of foreign bodies from the lower part of the pharynx and vestibule of the larynx and the upper part of the esophagus, as well as in tumors of the epiglottis, stricture of the pharynx, and tumors at the base of the tongue and pharynx. [The author states that a preliminary tracheotomy is not necessary. We think it is rarely necessary in operations about the mouth, pharynx, larynx, or trachea, if the patient is placed in the Trendelenburg position. The great aid this position affords the surgeon in such operations is not yet appreciated by the profession. It permits the blood to flow away from the trachea to the mouth and nasopharynx, and it escapes by the nose and mouth or can be wiped away. We have practically abandoned preliminary tracheotomy in such operations, although we are prepared to open the windpipe instantly if this at any time becomes necessary.]

Bayeux¹ asks: When is the **proper time to operate in croup?** He states that many years ago we never intervened early, because tracheotomy was always dangerous and very often useless. To-day we are loath to operate early because serum-therapy has effected so many cures. In the earlier period we were afraid to let the operation be postponed late because tracheotomy was the only operation we could do. At the present time it is not necessary to be so anxious, because intubation may be employed; especially what is known as momentary intubation, which can be repeated as often as is necessary. We must operate neither too soon nor too late. The author attaches importance to contraction of the accessory muscles of inspiration as an indication. He thinks that when these muscles are thrown into contraction, asphyxia is not many hours off. If this action of the accessory muscles occurs in a child from whom the intubation-tube has been removed, it calls for prompt replacement of the tube, and to the patient that has been tracheotomized it means a blocked cannula. The most important of these contractions is seen in the sternocleidomastoid. It is a rhythmic condition of tension which is synchronous with inspiration.

E. Peyrissac² reports a case in which a **plum-stone** became wedged in the **left bronchus** of a man of 18. He succeeded in removing it by a new method. He injected several cm. of cold water through the larynx and into the trachea; before doing so, of course, being prepared for the performance of tracheotomy if it should become necessary. The patient was told that when the water had been introduced he was to stop inhalations and to collect all his force for one strong cough. This injection resulted in a cough which expelled the plum-pit, surrounded as it was by mucus. [This procedure is subject to dangers which we would not care lightly to incur.]

¹ Jour. de Clin. et de Thér. Infant., Sept. 16, 1897.

² Rev. hebdom. de Laryn., d'Otol., et de Rhin., No. 1, Jan. 1, 1898.

Klein, Thilges, and P. Koch¹ report the case of a boy of 9 who suffered from lodgement of a **bean in the left bronchus**. It was advised that tracheotomy should be performed, but the parents of the child refused to allow it to be done. A violent attack of suffocation arose, and during this attack the bean could be heard striking against the glottis, and when the finger was placed over the trachea it could feel the bean scraping. The child had a number of attacks of this sort. Six days after the accident the parents gave permission that tracheotomy should be performed. When the trachea was opened the bean was quickly expelled. An interesting fact in the record of this case is that, in violation of the common rule, the bean entered the left bronchus rather than the right. This child made a satisfactory recovery.

J. Chalmers DaCosta² makes a preliminary report on a case of **gunshot-wound of the lung**. The patient was shot 11 days before admission to the hospital. On admission he had hemothorax, the line of dulness in front and to the side being just below the nipple-line. A few hours after admission he passed into collapse, and the line of dulness was found to have moved up to the second rib. "A U-shaped flap was cut, and on turning this up the bullet-wound was observed between the fifth and sixth ribs. About 6 in. of both the fifth and sixth ribs were resected, and on opening the pleural sac there was a furious gush of blood. The blood was mixed with air, and violent cough began. The wound was partly plugged, and the blood was permitted to flow out slowly. No clots were present. Practically all of the blood was caught, and it was found to measure one gallon and one-half pint (136 oz.). Examination of the lung showed that the lower lobe was lacerated, sloughing, and bleeding profusely. Ligatures and suture-ligatures would not hold. Catch-forceps failed to arrest the bleeding. The operator then grasped the lung and thus controlled the hemorrhage. To have simply packed gauze against the bleeding point would have done no good, as it would merely have pushed the lung away and the packing could not have been tightly applied. While the lung was compressed with the fingers the entire pleural sac about it was filled with sterile gauze. This afforded a base of support. The fingers were now relaxed and iodoform-gauze packing was forced against the bleeding surface. The sterile gauze previously introduced kept the lung from reeking, and the pressure of the iodoform-gauze controlled the bleeding. The ends of the pieces of gauze projected from the wound, and the flap of soft parts was sutured in place. The bullet was not sought for. The entire proceeding occupied 35 minutes from the time ether was started. After operation the patient was profoundly shocked, but by 2 A.M. he had reacted. During the ensuing 5 days he was delirious and very ill, but by the end of the first week was clearly out of danger. Several times during convalescence inspection of the pleural cavity by means of an electric light and mirror showed great masses of slough. These sloughs were as large as the hand, and were removed by forceps. Examination showed them to be composed of lung-tissue. Practically the entire lower lobe sloughed away. The gauze packing was removed June 22. There was no bleeding. Measurement showed that 42 square feet of gauze had been used. The man is now strong and well. The upper lobe of the lung is functioning actively. There is a large opening in the chest, from which there is a daily discharge of about 1 oz. of seropurulent matter. Examination with a mirror and electric light shows a considerable cavity. This cavity has diminished about one-fourth in size during the last 2 months.

¹ Brit. Med. Jour., Dec. 11, 1897, from Bull. de la Soc. des sci. Méd. du Grand Duché de Luxembourg, p. 91, 1897.

² Ann. of Surg., Jan., 1898.

During the operation 2 quarts of saline solution were transfused. A skiagraph shows the bullet in front of the chest."

Tuffier¹ made a report to the Twelfth Internat. Med. Congress upon the **surgery of the lung**. He pointed out the various ways in which the Röntgen-ray process can aid us in the diagnosis of surgical conditions of the lung, and then discussed various operations upon the lung. He tells us that when the parietal layer of the pleura has been laid bare, a pleural adhesion can be localized and identified by the fact that the visceral pleura at this point appears gray and fibrous. The identification of the pleural adhesion is of great value, because it may indicate the focus of disease for which we are seeking. If no adhesions exist, and the surgeon feels it necessary to protect the pleural cavity from infection, he should sew the 2 layers of the pleura together or endeavor to produce adhesions by the use of iodoform-gauze packing and application of zinc chlorid. When the lung itself is reached it should be incised fearlessly; and after an abscess has been opened a drainage-tube should be inserted. If we have opened into an area of the lung which is not septic, the lung-tissue should be sutured. If pneumothorax occurs the lacerated lung ought to be sutured. Dangerous hemorrhage rarely occurs in these operations, and the bleeding met with can usually be controlled by packing. In aseptic operations Tuffier tells us that he has had 76% heal by first intention. Primary tumors of the lung have not yet been operated upon, but several cases of pneumotomy for the removal of secondary sarcomata have healed. He reports 7 cases of wound of the lung which were treated by opening the pleural cavity, removing blood-clots, and suturing the lung, and all these cases recovered. In a case of localized tuberculosis in the beginning stage Tuffier removed the tuberculous focus with a knife, as though he were dealing with a tumor, and the wound healed satisfactorily. Two other like cases have been reported. Tuberculous cavities are very slow to heal; operation upon them gives bad results; and parenchymatous injections have proved futile. Of 45 cases of bronchiectasis with septicemia, in which drainage was inserted and maintained, only 7 improved. Sonnenberg² discusses the present status of the surgery of the lung. He divides lung-operations into pneumotomy and pneumectomy, and thinks in performing either of these operations it is wise to make an extensive flap and remove several ribs. This affords a large field of operation. He tells us that the pleura is often already adherent; but if it is not adherent, we should immediately suture it. He has not much faith in puncture of the lung, without preliminary rib-resection, as a means of finding pus, even when the abscess is near the surface; and if the abscess is deeply seated, repeated punctures with a short needle may be necessary. Some have held that puncture of the lung may lead to infection. It is certainly better to puncture after resection of the ribs. The use of a long needle endangers the vessels. Sonnenberg tells us that palpation is a quicker and better method of localizing the abscess than puncture. In order to carry out palpation he separates the parietal pleura from the ribs, carries his hand between this layer of pleura and the ribs, locates the difficulty, and resects the ribs over the diseased area. He tells us that if we find the pulmonary tissues hardened we should open them with a knife, because there is no danger of hemorrhage; but when we find them softened and inflamed we should open them with a canter, because there will be great hemorrhage if we cut them with a knife. When the abscess has been opened it should be widely opened and a tampon should be inserted. This rule is important when an abscess communicates with the bronchus, because if the operation is

¹ Medicine, Dec., 1897.

² Wien. med. Blätter, No. 40, 1897.

not performed in this manner the patient can scarcely breathe. Incision and drainage of echinococcus-cysts of the lung give an excellent result. Aspiration and injection are very unsatisfactory. Acute abscess of the lung affords a good prognosis if an early operation is performed. These abscesses are usually preceded by either genuine pneumonia or influenza. A chronic abscess gives a better prognosis; the tissue about it is much indurated, and an operation is commonly followed by a fistula; 80% of abscess-cases are in the lower lobe. A metastatic abscess is almost inevitably fatal, although if a primary abscess is in the neighborhood there is some hope; for instance, if it be a diaphragmatic abscess or an abscess of the liver. An abscess produced by a foreign body is usually putrid, and the foreign body may be quite a distance from the abscess. The only form of bronchiectasis which should be operated on is the single sacculated variety. The small multiple forms almost invariably leave fistulae. There are 47 cases of gangrene of the lung on record for which operation has been performed, and 35 recovered. Actinomycosis may be operated upon, especially when it forms superficial abscesses.

John B. Murphy,¹ at the last meeting of the American Medical Association, delivered the address on surgery, his subject being the surgery of the lung. He gave a review of the history of pulmonary surgery, and considered in full the anatomy and physiology of the lungs. He then took up pulmonary operations. Certain questions must be considered: 1. Is the lung, surrounded as it is by bones, accessible to surgery? 2. What difficulties and dangers are met with in entering this cavity? 3. To what extent is it admissible to remove and to replace this wall, and to what extent can intrathoracic manipulations be carried? 4. What would be the result of opening the pleura in pneumothorax when there are adhesions, and when there are no adhesions? 5. How could its dangers be avoided or lessened? 6. Should the pleura be closed or drained? 7. Should the lung be incised or excised, or placed out of function? 8. What are the dangers and limitations in pneumotomy? He considers them to be hemorrhage from the incision in the chest-wall and the cut ribs, pneumothorax from the opening into the bronchi, inflammation of the pleura of the same side or of the other side, traumatic pneumonia, and sepsis. 9. What pathologic conditions of the lung require excision? He considers them to be hernia, injuries with infection, abscesses, bronchiectasis, gangrene, lodged foreign bodies, tuberculous cavities, hydatid cysts, and actinomycosis. 10. What are the dangers and limitations in pneumotomy? He believes that the immediate dangers are hemorrhage, pneumothorax, and dyspnea; and the later dangers are shock, dyspnea, hemorrhage, sepsis, pleuritis, and pneumonia. Murphy then considered at length the best method of treating the intrathoracic stump. 11. How is the chest fitted for excision? What are the conditions in which excision is needed or is justifiable? He states that these conditions are tumors of the chest-wall and circumscribed areas of tuberculosis. 12. How can the lung be artificially placed out of function and kept quiet? He tells us that this can be accomplished by injections into the pleural cavity, or by resecting ribs and allowing the chest-wall to collapse. 13. What are the difficulties technically of intrapleural injections? They are adhesions and consolidations. The dangers are air-embolism, subpleural emphysema, pulmonary emphysema, dyspnea, and sepsis. Murphy then showed that we can tell that the injected material is entering the pleural cavity, and not the lung or bronchus; and he considered at length the effect produced by injecting the pleural cavity with gas and allowing the lung to become quiescent. This effect is particularly noticeable in cases of tuberculosis. Murphy con-

¹ Med. Rec., June 18, 1898.

sidered the diagnosis of pneumothorax, hernia of the lung, wounds of the lung, infective lesions of the lung and abscess-bronchiectasis, gangrene, foreign bodies, tuberculosis, hydatid cysts, actinomycosis, and secondary tumors. He said that surgeons had always been afraid of pneumothorax. He believes that the dyspnea in pneumothorax is due to the vibration of the septum of the mediastinum serving to counteract the piston-action of the diaphragm. If it is possible to render immobile the septum of the mediastinum, the greater danger of pneumothorax would cease. The natural method of arresting or curing a tuberculous area in the lung, as elsewhere, is for it to become surrounded with connective tissue. The formation of connective tissue is favored by immobilizing the part. Plastic pleuritis tends to cure tuberculosis of the lung. It has long been known that the lung could be compressed for a long period, and that when freed from pressure it would expand again. The method of treating tuberculosis of the lung by compression is old, and not modern. Murphy believes that we can successfully treat tuberculosis of the lung by injecting nitrogen gas into the pleural cavity. He prefers nitrogen because it is harmless and because it is absorbed very slowly. After injection the nitrogen is allowed to remain for a number of months, the lung being collapsed and at rest, when the gas can be withdrawn and the lung be allowed to resume its function. In one case he injected 105 cu. in. of nitrogen, producing only slight and transitory dyspnea. Skiagraphs were taken at intervals during 5 weeks, and they show that the gas disappeared slowly. The patient on whom this injection was used was very much improved; and Murphy has had other cases which gave him satisfaction. So long as the chest is not opened and the diaphragmatic vibrations are not prevented, there is no danger of pneumothorax, although, of course, there is a possibility of air-embolism if the trocar is carried into a vein. He recommends this treatment in the early stages of tuberculosis, when there is a small cavity at the apex.

Zeman¹ has devised a new **method of irrigation in empyema**. Cases of empyema with fistulae can be irrigated by placing the patient in a warm bath. If the fistulous opening is on a lower level than the fluid of the bath, and the patient inspires and expires freely while in the bath, a current of air will flow into and out of the pleural cavity, and this current is stronger than can be obtained by an ordinary irrigation-apparatus, and will bring away masses of fibrin and coagulated blood. The bath should consist of cool boiled water, being at the temperature of the body, and last 10 or 15 minutes.

Pichler² reports a number of cases of **empyema** and **pneumothorax treated by permanent drainage**. There were 13 cases: 5 were cured, 2 (both tuberculous) were improved, and 6 died. His method is to incise the skin and then insert a trocar, the tube of the instrument having a diameter of about 6 mm. A complication that is sure to arise is the passage of pus between the edge of the wound and the drainage-tube. This can usually be corrected by inserting a larger tube; but in some cases it cannot be prevented. In the 2 tuberculous cases it could not be stopped, for caries of the ribs occurred. A graver complication is the appearance of fetid pus. If this condition arises, irrigation of the pleural cavity may possibly arrest it; but it is probably best treated by immediate thoracotomy. This method of drainage is most useful in recent cases. It will probably fail in old cases, although it is justifiable to try it in these. It should only be employed when the patient is under the immediate control of a surgeon and can be carefully watched. In any case

¹ Med. News and Pediatrics, Aug. 15, 1897.

² Deutsch. Arch. f. klin. Med., Dec. 22, 189

in which there is pronounced respiratory disturbance thoracotomy is preferable. The author suggests the possibility of treating purulent peritonitis in a similar manner, and reports a successful case in which it was employed.

Samuel West¹ reports a case of **pyopneumothorax** of several months' duration cured by **free incision**, and makes some remarks on the surgical treatment of pneumothorax.

B. Farquhar Curtis² discusses the **treatment of chronic empyema**. He tells us that some few cases are chronic from the start, beginning like a cold abscess; but, as a rule, a chronic empyema begins as an acute inflammation. After the pus has been in the chest for some time the compressed lung contracts strong adhesions, and the pleura becomes an inch or more thick because of the layers of fibrin deposited upon it. The result of these changes is that when simple drainage is applied to such a case the lung is so firmly bound down that it cannot expand. Every acute empyema should be drained early, free incision being the safest and quickest method. Early operation is very important to prevent this anchoring of the lung. The opening should be made in the chest low down and far back, a portion of the rib being resected. Such treatment will prevent the unfortunate sequelæ which attend a chronic empyema, and will rapidly cure an acute empyema. Having drained an acute empyema, the question when drainage should be discontinued comes up. Some authorities leave the tube in place until it is pushed out by cicatrization of the sinus. In some respects this advice is sound, for of two evils an obstinate sinus is better than reaccumulation of pus. If the cavity of an empyema has contracted to a narrow space between the lung and chest, the tube should be long enough to reach almost to the end of the cavity. It is a good rule to have a drainage-tube about $\frac{1}{2}$ in. shorter than the sinus, so that the tube does not make pressure in the deepest part of the canal. Prolonged retention of the tube may produce a callous sinus. The common cause of chronic empyema is the slipping of the drainage-tube into the chest. Drainage-tubes for such cases should be of fresh rubber, and whenever they are found to be brittle they ought to be changed. If the rubber is good, the tube can be secured by passing a safety-pin through one side of the outer end and fastening it by threads around the chest or by strips of adhesive plaster. It is always well in empyema-cases to make a bacteriologic study to determine if tuberculosis exists. It is important to distinguish cases of chronic empyema in which a free external opening exists, whether this opening has been made by the surgeon or has formed spontaneously, from those cases in which there is no drainage. The first form is spoken of as open empyema; the latter as closed empyema. If the entire pleural sac is involved the case is one of total empyema. When the area of disease is smaller the case is spoken of as partial, localized, or encapsulated empyema. A long and narrow cavity is called a pleural fistula. If the closed empyema does not communicate with the bronchus the pus is usually laudable. Some of these cases recover after simple drainage; but, as a rule, where the lung is so firmly bound down by adhesions that it cannot expand, even a simple incision of the chest is dangerous, for the opening of the cavity to the outer air, plus the opening into the bronchus, makes a great alteration in the conditions of air-pressure within the chest, and during the operation fluids may pass from the cavity to the bronchi, the patient possibly drowning in his own secretions. Drainage by incision is usually the only possible treatment in such a condition, for with air also in the chest, aspiration will not thoroughly remove the pus. The best treatment is to make an incision, resect a small piece of rib, open the pleural cavity, and delay

¹ Brit. Med. Jour., Nov. 27, 1897.

² Med. Rec., Mar. 19, 1898.

further interference until the patient recuperates, the radical operation being performed when it is evident that the lung will expand no further and the cavity will contract no more. This can be determined by noticing that the margins of the ribs are in contact and by repeatedly measuring with a probe, or by filling the cavity with a measured quantity of liquid. Some surgeons advise the radical operation if an empyema which has been operated on remains stationary for 2 weeks; but Curtis thinks from 4 to 6 weeks the proper time to wait. Pleural fistulæ are usually produced by prolonged retention of the drainage-tube after empyema, but they may be due to rib-necrosis. In some cases a cure can be effected by simply enlarging the sinus. In other cases it is necessary to remove a rib. It may even be necessary to resect a number of ribs. Curtis then describes the technic of the radical operations of Estlander and Schede, and presents statistics of these operations, with some cases of his own. He tells us that the secret of success in such cases is the employment of light anesthesia and the proper control of hemorrhage.

DISEASES OF THE VASCULAR SYSTEM.

Semeleder¹ reports a case of **wound of the heart**. A man, 27 years of age, had been stabbed twice in the chest. One wound was between the third and fourth costal cartilages of the left side, a little less than 1 in. from the edge of the sternum. The other wound was at the inferior margin of the spine of the left scapula. There was very slight bleeding from this wound, and the patient suffered but little pain. The wound in the back healed in a few days, and the other was healing rapidly. Six days after the injury the patient began to suffer from pain in the abdomen, and a week after the accident died very suddenly. Examination showed that the chest-wall was united to the pericardium and diaphragm by extensive adhesions. The right side of the pericardium exhibited a healed scar 1 in. in length. The pericardial sac contained a little clear fluid. The outer side of the right ventricle contained a healed wound, $\frac{1}{2}$ in. in length, which had not completely passed through the thickness of the heart-muscle. In the heart was a pale, fibrous clot. The patient died from pulmonary compression resulting from effusion of sero-sanguinolent fluid.

Frank Blaisdell² reports a case of wound of the heart. The patient, a boy 12 years of age, leaned out a window after sticking a needle in his coat. As he leaned forward he gave a scream, placed his hand over his heart, and jumped backward. He was unable to lie down because of cyanosis and violent pain. The pulse was rapid; the nose, lips, and ears cyanosed. In the third interspace a little projection was noticed, which became prominent during the systole and disappeared during diastole of the heart. An incision was made; a small black point was discovered, which was caught with forceps and drawn out. It was found to be a needle which was sticking in the heart. The patient recovered rapidly after the operation.

J. Rudis-Jicinsky³ reports a case of **stab-wound of the heart**. A man, 25 years of age, was stabbed in the pericardial region and also in the temporal region. The first wound was beneath the fifth rib, $1\frac{1}{2}$ in. to the left of the middle of the sternum. There was free bleeding, but very little gaping. Probing showed the wound to be 3 in. deep, passing through the pleura, lung, pericardium, and heart-muscle at the apex. The second wound was not important. Both wounds were cleansed and dressed, the patient was placed in bed, and

¹ Wien. med. Presse, No. 48, 1898.

² Atlantic Med. Weekly, Aug. 7, 1897.

³ N. Y. Med. Jour., Apr. 23, 1898.

orders were given to keep him absolutely at rest. His temperature at this time was subnormal; his pulse intermittent, feeble, and compressible; the cutaneous surface pale; and the power of speech was lost. After a few hours reaction was obtained. The next day there was delirium, with symptoms of internal hemorrhage, bulging of the intercostal spaces on the left side, and dyspnea, but not much external bleeding. There were nausea, vomiting, and pain in the chest-wound. On the fifth day after the accident there were distinct fever, increasing dyspnea, and bulging of the intercostal spaces over the left side of the chest, with dulness on percussion. It was feared that decomposition of the clots had taken place and that an empyema had formed. An incision was made in the eighth interspace in the axillary line, and 2 drainage-tubes were inserted, 1 in the original wound and the other through the surgical opening up to the wound. There were an extensive hemothorax and many clots. His treatment was subsequently chiefly rest, cleanliness, supporting diet, etc. During the next 3 or 4 days the symptoms did not improve. During the subsequent week the patient hovered between life and death. The thoracic cavity was washed out 3 times a day with bichlorid solution, 1:5000. During the next week his condition was still unsatisfactory, and the use of bichlorid was abandoned, solutions of potassium permanganate and hydrogen peroxid being used for washing, and pills of tannic acid, lead acetate, and powdered opium were ordered. A clean catheter was passed through the original wound to the posterior mediastinum and about 15 oz. of pus withdrawn. As soon as this was done the patient felt much relieved. The subsequent progress of the case was favorable, and the patient finally recovered. The author says that in this case it seems clear that the puncture of the heart did not give rise to much bleeding. Pain was present, due probably to pericardial lesion. Many cases have been reported in which recovery followed heart-wounds. Fischer collected 401 cases of heart-wounds, with 50 recoveries, the diagnosis in 33 of the latter being finally confirmed by autopsy. The patient in the above report is well one and a half years after the accident.

Samuel Prior¹ reports a case of **wound of the heart** followed by recovery. The patient was a man 43 years of age, and was epileptic. He labored under mild dementia, was a confirmed pickpocket, and had some years ago shown a strong suicidal tendency, having tried to cut his throat. Recently he made another attempt at suicide, forcing an iron pin into his chest in the region of his heart; the pin entered $1\frac{3}{4}$ in. below and 1 in. internal to the left nipple. The pin was seen to move with every beat of the heart, travelling about 1 in. upward and downward at every pulsation. On grasping the pin it was determined that it was embedded firmly in the wall of the heart, which was felt pulling at the inner end. The pin was withdrawn gently after rotation. The patient was in collapse, there was but slight bleeding from the wound, and there was no sign of any effusion of blood or serum into the pericardium. The patient would not answer when spoken to, but was conscious of all that was said or done. Antiseptic dressings were applied. The next day there was a small amount of subcutaneous emphysema about the wound. The physical signs of pneumothorax were also detected, but the pneumothorax and the emphysema both disappeared in 24 hours. Thirty-six hours after the accident the temperature was 101° F., the highest point it touched. The temperature was slightly febrile for a week and then became normal. The wound remained aseptic. The patient would take no food or drink for 4 days, and then asked for a drink of water. Soon after the removal of the pin a sphygmograph was used, and the tracing showed a pulse of low tension, slightly irregular, and almost fully

¹ Lancet, Oct. 9, 1897.

dierotic. On the third day the pulse was better and the dierotism had nearly disappeared. Normal tracings were obtained on the fifth day. Six months after the accident there were no signs of pericardial adhesion, and the only evidence of injury is the red linear scar $\frac{1}{2}$ in. long. In this case the pin must have sunk at least 2 in. into the left wall of the left ventricle, but did not enter the cavity of the ventricle. [Clinical observations of various surgeons, as well as the experimental studies of Bode, show that wounds of the auricles are vastly more dangerous than are wounds of the ventricles; and that wounds of the thick left ventricle are not so dangerous as are wounds of the thinner right ventricle, the hemorrhage being less.]

Stanislao Canali¹ reports a case of **wound and suture of the pericardium**. The patient had been wounded in the left thoracic region, 2 finger-breadths from the edge of the sternum, and had also been wounded in the left flank. A large amount of black blood was flowing out of the thoracic wound. The third, fourth, and fifth ribs were resected. The wall of the chest was opened in the longitudinal direction, and the tissues back of the sternum were found to be infiltrated with blood. An opening was found from which blood was flowing. This opening was stretched, and the surgeon could then see the cavity of the pericardium filled with blood and blood-clots. The clots were removed, the pericardium sutured, the chest-wall closed, and the abdominal wound treated. After the operation the heart became normal in its movements, but the patient died from peritonitis. The autopsy showed that the pericardial wound was so sealed by fibrin that it was scarcely possible to find it.

Rivir² reports a case of **contusion of the carotid artery** which resulted in death. The patient was knocked down upon a railroad, and the upper part and right side of the thorax was jammed between the wheel and the rail. The patient was conscious when brought into the hospital. The clavicle of the right side was fractured, and there was an extensive effusion of blood in this region. The upper 4 ribs were fractured; the clavicle of the left side was not broken, but an ecchymosis existed in the tissues of the neck. When in the hospital, while turning onto his back, the patient became suddenly paralyzed and lost the power of speech; the right arm and leg were paralyzed; the mouth was drawn to the left side; the tongue could not be protruded; but there was no ptosis, and tactile and thermal sensibility was retained. In a few moments the patient became unconscious, and it was found that pulsation had disappeared from the left carotid artery and the temporal arteries. A diagnosis was made of thrombosis of the left carotid. The next day there was complete analgesia of the paralyzed side, and swallowing was impossible; the patient died that evening. The postmortem showed that there was an area of ecchymosis around the common carotid artery a little below the level of the left clavicle, the internal and middle coats of the vessel were ruptured, and a clot had formed on the roughened surface, which clot extended as far as the origin of the external carotid. There was no thrombosis or embolism in the brain. The author says that this case is similar to the one recorded by Verneuil, and it teaches us that if a case shows symptoms of a cerebral lesion the neck should be examined, because injury of the carotid artery may produce all the signs of cerebral hemorrhage.

Lindner³ reports a case in which, while effecting closure of a fecal fistula, he **opened** both the common **femoral artery and vein**. He cut away about $\frac{3}{4}$ in. of the wounded vein and applied 2 ligatures. He arrested bleeding in the artery by the use of 2 layers of fine silk sutures. The patient

¹ Arch. of Pediatrics, Sept., 1897.

² Sem. méd., Mar. 9, 1898.

³ Berlin. klinik, Apr., 1898.

recovered. The author says that whereas it is not particularly dangerous to tie a large vein alone or a large artery alone, if we ligate both vessels gangrene is apt to ensue, and this is more particularly the case after injury of the common femoral vessels than after injury of the axillary vessels or the vessels of the neck. It has been proved positively by the experiments on animals and by the cases operated upon by Schede that a wounded vein may be sutured satisfactorily without being followed by phlebitis. Suturing is much more urgently necessary in the case of a wounded artery than of a vein; for even if a wound of the artery is very small, it can rarely be satisfactorily controlled by compression. Experience has shown, however, that it is not safe to attempt to suture a transverse wound which involves more than half of the circumference of the artery. In such a case we should follow the plan devised by Murphy, and resect the damaged portion of the artery and invaginate the central end into the distal end, fixing the ends by 5 sutures. Lindner believes that we should pass sutures through all the coats of the vessel, and he thinks that fine silk should be used, and not catgut. [It has come to be generally recognized among surgeons that in many cases of vein-wounds it is better to suture the vein than to ligate it. In the case of cut arteries the custom is to ligate rather than suture. And yet it is obviously most desirable, if a large artery is injured, to suture rather than to ligate, because ligation must abrogate the function of the artery and may lead to gangrene, and suture permits the artery to continue its functions. Glück has reported a case in which Char-teuiffel succeeded in suturing a wound in the femoral artery. Israel reported a case in which he sutured the external iliac artery. Heidenhain sutured the right axillary artery. Murphy has resected an injured portion of the femoral artery and sutured the ends. It is proved that arterial wounds can be sutured, and in many wounds of large arteries suturing is preferable to ligation. If a transverse wound involves more than three-eighths of the circumference of the vessel it is best not to suture at once, but first to resect the damaged area and then invaginate the central end into the distal end and hold it by sutures (Murphy).]

Paul Carnot¹ recommends the use of **gelatin as a hemostatic agent**. He believes that gelatin when applied locally hastens coagulation of the blood. The fact that gelatin possesses this power of coagulation was discovered by Dastre and Floresco. The authors distinguish between coagulation of the blood and gelatinization of the blood, and decide that an amount of gelatin so small that it cannot cause gelatinization greatly hastens coagulability. Carnot believes that both these properties, the coagulating and the gelatinizing powers, should be utilized; and it is because the substance possesses this double power that he greatly prefers it to calcium chlorid. He has used this agent as a local hemostatic and to effect the coagulability of the entire blood-mass. As a local hemostatic, he dissolves the gelatin in normal salt solution, 5 parts of gelatin and 95 parts of salt solution. Salt solution is rendered sterile by boiling it for 15 minutes on 2 occasions. The temperature of the fluid should not be raised to 239° F., for that might destroy the gelatinizing property. An antiseptic agent may be added; but it is not really necessary. Carnot used this agent successfully, first, in epistaxis in children, injecting the nostril from which the blood proceeded with 30 to 40 c.c., and then inserting a tampon wet with the same solution. In 1 case various other methods had proved futile, and the child was nearly bloodless, but the gelatin arrested the hemorrhage at once. The solution should not be used too hot, because gelatinization would be rendered slower, and because the gelatin acts by contact with the blood, and

¹ Presse méd., Sept. 18, 1897.

the heat would arrest hemorrhage temporarily, and, the blood and the gelatin not being in absolute contact, no clot would form in the vessels. The solution used should be about the body-temperature. For a surface-wound it is only necessary to moisten the wound with a few drops of the solution and leave in place for a short time some material impregnated with the solution. Hemorrhage from the rectum can be treated in the same manner, and so can hemorrhage from a varicose vein; but hemorrhages from the stomach cannot, because the gelatin is subject to digestion. In uterine hemorrhage an intra-uterine injection of gelatin can be given, careful asepsis being preserved. In the arrest of graver hemorrhages Carnot has tried experiments on the lower animals. After resection of very considerable portions of the liver he found it unnecessary to ligate, but arrested the hemorrhage by a very short application of the gelatin solution. A clot rapidly formed, and as soon as it formed the liver was replaced in the abdomen and a few c.c. of gelatin were poured into the hepatic peritoneum before it was closed, to guard against recurrent bleeding. Carnot thinks that intravenous injection of gelatin in the human subject is unwarranted, because it might induce massive clots. He has several times injected gelatin subcutaneously and into the rectum in "bleeders." [We have used gelatin locally with much satisfaction in epistaxis and in a case of hemophilia.]

Silvestri¹ advocates the **hyposulphite of lime as a hemostatic**. It is given internally in powders, 8 gr. being administered during the course of a day. He holds that it increases the coagulability of the blood.

Geo. W. Spencer² discusses **intravenous injections in shock and hemorrhage**. The author refers to the older operation of transfusion of blood, and condemns it as dangerous, and sets forth various reasons why the intravenous injection of saline fluid is a much safer and more satisfactory procedure. He shows that it is of great value in hemorrhage, serving to replace for the time the blood lost with noninjurious fluid, this fluid filling the heart-cavities and giving the heart something to contract upon. Spencer claims that intravenous saline injections are of great use in shock. In severe hemorrhage the subcutaneous tissues are practically bloodless, and drugs given by the stomach or inserted hypodermically will not be absorbed. The same is true of shock. In hemorrhage a man is bleeding from his vessels, and in shock he is bleeding into his abdominal veins. Intravenous saline injections, if given in shock, sustain the heart, and furnish something for it to contract upon and restart the circulation. Rest and external heat should also be employed. When signs of reaction appear, give drugs. The quantity of saline fluid injected depends upon the age, the degree of shock, and the amount of hemorrhage (from a few ounces to 4 quarts). The signs that it is beneficial are a return of pulse, lowering of number of heart-beats per minute, and the reappearance of color to the surface. The temperature of the solution should be 100° F. Let the fluid flow gently, and watch the pulse for fear of overloading the vessels. The median basilic vein is usually selected to receive the solution. The parts are rendered aseptic, a bandage is tightly applied above the elbow, an incision is made over the vein and through the skin and superficial fascia, a layer of fat is torn through with a blunt instrument, and the vein exposed. Three catgut ligatures are passed under the vein. The ligature at the lower angle of the wound is tied. Well above the tightened ligature an opening is made in the vein just large enough to admit the cannula; the cannula of Collin's apparatus is introduced, the middle ligature is tied to hold the vein-wall in close contact with the cannula, and the fluid is introduced. After suf-

¹ Jour. Am. Med. Assoc., Feb. 12, 1898.

² Therap. Gaz., Mar., 1898.

ficient fluid has been given the cannula is withdrawn, the ligature in the upper angle is tied, the ends of all the ligatures are cut off, and the wound is sutured and dressed. Spencer reports some cases which serve to exhibit clearly the great value of the method.

Cumston¹ writes upon **Trendelenburg's operation for varicose veins**. He considers this the best of all methods for treating varicosity with ulceration of the lower extremity. Trendelenburg, believing that varicosities depend upon great central pressure, claims that to intercept this force will cure, and seeks to accomplish this by ligating the saphenous vein in 2 places and removing a piece from between the ligatures. An incision 4 in. in length is made over the saphenous vein. This incision is at the junction of the lower and middle thirds of the thigh. The vein is exposed and cleared, every exposed branch is ligated, the main vein is ligated at the lower angle of the wound and also at the upper angle, and the portion of vein between the ligatures is excised.

Delbet² asserts that in every case of **varicose veins** in which a vein ruptures, or in which an ulcer exists, there is incompetence of the valves in the internal saphenous vein. There may be valvular incompetence even when the vein is not dilated. Delbet maintains that varicose ulcers result from variations of pressure in the vein, these variations being due to incompetent valves. The incompetence may be harmful (1) by permitting intravenous pressure to equal the pressure in the arterioles, capillary circulation being brought to a standstill; or (2) by forming what has been called a venous circle, the blood in which loses its nutritive elements. Trendelenburg demonstrated the *circulus venosus*. The blood in the saphenous vein flows toward the periphery instead of toward the center; it encounters in the leg the branches which run from the superficial to the deep veins. The valves in these anastomoses will only allow the blood to flow from the superficial to the deep veins, and the blood in the saphenous vein passes into the tibial and peroneal veins, and from them into the popliteal and femoral. At the point where the saphenous joins the femoral some of the femoral blood enters the saphenous and passes around the circle again, and so on. Delbet makes the following classification of varicose veins: 1. Those with elevated pressure. They are caused by incompetence of saphenous valves, and usually begin in the thigh. 2. Those with low pressure. They begin in the leg and give rise to but little annoyance. The valves are sound in these cases. The first class are treated by Trendelenburg's operation, which replaces high pressure with low pressure. Operation greatly benefits, but does not radically cure, varices.

Hill³ treated an **aneurysm** of the arch of the aorta by simultaneous ligation of the right common carotid and subclavian arteries. Five days after the operation it was noticed that the aneurysmal bruit had become fainter. Two weeks after the operation there was neither bruit nor pulsation, and a depression upon the chest-wall marked the site of the former swelling. The patient is much relieved, and both pain and dysphagia have been largely mitigated. Lancereaux⁴ reported to the Académie de Médecine a case in which he treated a large **aortic aneurysm**, in a man of 45, by injecting gelatin into the gluteal region. The gelatin increased the coagulability of the blood. The aneurysm rose from the ascending aorta and was of large size, each diameter being 5 in., a part of the sternum and some rib-cartilages and ribs being eroded. In the course of 2 months 12 injections, of 150 c.c. each, were given, with the result that the aneurysm shrunk markedly in size and became much

¹ Ann. of Surg., May, 1898.

² Sem. méd., Oct. 13, 1897.

³ Cincinnati Lancet-Clinic, Mar. 19, 1898.

⁴ Deutsch. med. Woch., Aug. 12, 1897.

firmer, although it still pulsated to some extent. The subjective symptoms were so much relieved that the patient would not trouble himself to go on with the treatment.

Geo. W. Gay¹ ligated the **innominate artery** for aneurysm at the point of bifurcation of this artery, in a woman 39 years old. The patient was anesthetized. An incision was begun at the anterior edge of the right sternomastoid muscle, 2 in. above the clavicle. The incision was curved downward and inward, crossing the left sternoclavicular joint, to a point 3 in. below the summit of the sternum. This cut was joined by another cut which was 3 in. long and was over the right clavicle. A flap composed of skin, superficial fascia, and platysma was raised up. Both portions of the sternomastoid muscle were cut. The fibers of the sternohyoid and sternothyroid were not cut, but were retracted. The right sternoclavicular joint, 1 in. of clavicle, and 1 in. of the upper and outer part of the sternum were removed. The sheath of the innominate was divided and was easily separated from the vessel with the finger. Three braided silk ligatures were applied, being passed from within outward. The first ligature was applied $\frac{3}{4}$ in. above the aorta and was tightened gradually; the second was applied $\frac{1}{2}$ in. beyond the first; and the third was applied as a reinforcement to the second. After closure and dressing of the wound the right upper extremity was wrapped in cotton. On the sixth day pus was noticed and a sinus formed. On the thirty-second day there was bleeding from the sinus, which was controlled by packing. It was thought best to ligate the right common carotid. During the next few days there were episodes of bleeding from the sinus. On the forty-second day after the ligation of the innominate there was a fatal hemorrhage. The postmortem showed that the aneurysm had become an abscess. Gay considers the calamity in this case to have been due to septic ligatures.

D. D. Stewart² publishes the result of a postmortem in a case of large **innominate aneurysm**, in which, 41 months before the man's death, he had introduced 10 feet of wire into the sac and used galvanism, with the result that complete solidification had occurred. This man had had syphilis. At the time of operation the aneurysm appeared as if ready to burst. The patient died 41 months after the operation, from a thrombus in the middle cerebral artery, the result of arteritis. The postmortem showed that there were thickening and a fusiform aneurysm of the aorta. A sacculated aneurysm arose from the root of the innominate. The sac was entirely consolidated, and in the organized mass was the coil of wire. In this operation Stewart uses gold wire. The amount introduced depends on the size of the sac. For a sac 3 in. in diameter from 3 to 5 feet of wire are enough; for a sac 4 to 5 in. in diameter introduce 8 to 10 feet. The positive pole is the active electrode. The negative pole is connected with a clay plate or a cotton pad, and placed upon the abdomen or back. The strength of current is from 40 to 80 ma., and it is passed for an hour to an hour and a half. The current is slowly turned on and slowly increased. After the current is turned off the wire is detached from the battery-wire and the needle is withdrawn. The wire from the sac is pulled on lightly and cut off close to the skin, and the cut end pushed beneath the skin. Changes in the aneurysm are usually detectable before the end of the séance, and become very evident in the course of a few days. In cured cases expansile pulsation ceases, and there remains a hard mass, which is lifted by communicated pulsation.

Henry Gray Croly³ exhibited a patient whose left **subclavian artery**

¹ Boston M. and S. Jour., July 22, 1897.

² Brit. Med. Jour., Aug. 14, 1897.

³ Dublin Jour. Med. Sci., Mar., 1898.

had been **ligated** in the second part one year before. He had been stabbed once below and once above the clavicle. There was violent arterial bleeding and the arm became powerless. There were a large hematoma and a distinct bruit; the man was badly collapsed, and there was no radial pulse. The patient was reacted, and under rest and pressure the tumor diminished considerably. Six months after the injury an aneurysm formed. Three months later the patient was readmitted and the artery was ligated. An incision 2 in. in length was made along the outer border of the sternomastoid. A second incision was made above the clavicle, from the sternoclavicular articulation to the acromion. Both origins of the sternomastoid were cut. The aneurysm was found to involve the entire third part of the artery. The omohyoid was drawn up and the outer border of the anterior scalene was found. The phrenic nerve was exposed. The outer half of the scalenus anticus was cut and the arterial sheath was opened. At this stage the pleura bobbed up like a white glove-finger. The aneurysm-needle was passed under the artery from below, was threaded with a double ligature of gold-beaters' skin, and withdrawn. The ligature toward the heart was first tightened with a reef-knot; the second ligature was tightened, and the 4 ends were secured with a stay-knot. The ends of the ligature were cut and the wound closed. The arm and shoulder after the wound was dressed were wrapped in cotton. The patient made a rapid recovery. He is now in good health and can use his left arm perfectly.

B. Farquhar Curtis¹ reported to the N. Y. Surgical Society, Dec. 8, 1897, a case of **ligation of the first part of the subclavian artery**. The patient was a Swede, 42 years old. One year ago he noticed a tumor above the right clavicle. Eight months ago he entered the hospital. The arm was edematous, the tumor pulsated, there was a loud bruit, and it was evident that the aneurysm involved the third part of the subclavian. Four months ago he was operated upon. A vertical incision was made along the inner border of the sternomastoid and the muscle was partly divided. The sternal end of the clavicle was thrown outward. The artery was exposed and two ligatures of chromic gut were thrown around it $\frac{1}{8}$ in. from the thyroid axis. The ligatures were tied after the method of Ballance and Edmunds, so as to bring in contact the inner coats of the vessel, but not to divide any of the vascular tunics. The clavicle was returned into position and anchored with chromic gut. The wound was closed without drainage and healed by first intention. Within 24 hours the circulation in the fingers was normal. The man is perfectly well. The author says that this is the first **successful case of ligation** by modern methods of the **first part of the subclavian**, and he considers a large element in the success was the use of the Ballance and Edmunds plan. Souchon says there have been 16 cases (14 on right side), with 16 deaths. In 2 cases the carotid was also tied. Mitchell Banks's cases lived a month, and then died of secondary hemorrhage through a ligature-sinus. Halsted reported a successful ligation of the first part of the left subclavian, preliminary to extirpation of an axillary aneurysm. This case is not included in the above enumeration. All the deaths were due to secondary hemorrhage or other septic complication. Time only can tell if cure in this patient is permanent. Stimson said in the debate that he was convinced that the common idea regarding the action of the wide ligature was false. Even if such a ligature does not divide the inner and middle coats, the pressure produces molecular absorption of these coats under the ligatures, a result identical with division. Dawbarn doubted if the stay-knot had contributed to the success. These authors used dentists' twisted (floss) silk tied flat, like a tape. Curtis had used catgut.

¹ Ann. of Surg., Apr., 1898.

Probably the ordinary surgeons' knot would have proved as efficient. Curtis agreed with Stimson in regard to the change produced in the vessel-wall, but claimed that in the newer method the change was produced more slowly, and if sepsis occurred the danger would be vastly greater if the older knot were used.

Chilton¹ operated for **aneurysm of the third portion of the right subclavian artery**. A double ligature of gold-beater's skin was applied upon the first portion to the inner side of the anterior scalene muscle. The vessel was occluded, but care was taken not to divide the coats. The wound healed by first intention. Six weeks after the operation pulsation returned in the aneurysm, and it was believed that the ligatures had been absorbed too early. The parts were opened, and at the spot where the ligatures had been applied the artery was of normal size. The ligatures had certainly been absorbed before the artery was obliterated. The artery was again ligated, to the inner side of the area of the first ligation and between the vertebral and thyroid axis. A double ligature of floss-silk was applied and the coats were not ruptured. Six days after the second operation it was found that the aneurysm still pulsated and gave origin to a bruit. The next day the first portion of the axillary was tied below the clavicle with a double ligature of floss-silk, after the method of Ballance and Edmunds. The pulsations gradually disappeared. The patient was cured—the first case on record.

Hinde² reports a case of traumatic **intracranial aneurysm of the internal carotid** cured by ligation of the common carotid. The patient was a Chinaman, aged 36. Eighteen months before admission he had been struck upon the shoulder and knocked down, and as he fell his occiput struck the pavement. Some time after the fall his eyes became red and congested, and the right eye was observed to be bulging. At the time the patient came under observation the palpebral, conjunctival, subconjunctival, and anterior ciliary veins of the right eye were tortuous and greatly enlarged, and there was decided exophthalmos. These vessels did not pulsate. There was some limitation of the power of abducting the eyeball. The right pupillary reflex was weakened. The retinal veins were enlarged and tortuous, but did not pulsate. The arteries were of normal size and were not tortuous. Around both arteries and veins perivaseculitis was noticed; choroid and retina appeared normal. Visual power was slightly diminished on the right side, but both visual fields were normal. There was some lessening of sensibility of the right cornea. When a stethoscope was applied over the closed right eye a bruit could be distinctly appreciated. The same bruit was audible, but less distinctly, over the right temporal region, and still less distinctly over the left temporal region. The bruit was increased by stooping, and entirely disappeared on compression of the right common carotid. The patient stated that a few days after his fall he became conscious of a noise within his head, which noise had continually augmented in intensity. The diagnosis was made of an aneurysm of the internal carotid artery, arising secondarily to fracture of the base of the skull, and situated at the point where the vessel passes on the side of the body of the sphenoid bone, a spot at which the aneurysm compresses the cavernous sinus and the sixth nerve, and to a slight degree the ophthalmic division of the fifth nerve. To be certain that the condition was not due to syphilis, potassium iodid was given for 6 weeks, without benefit. The common carotid was then tied. The bruit at once ceased. The exophthalmos for a time increased, but gradually passed away. By the use of the faradic current the paresis of the internal rectus was much benefited. The patient was cured.

¹ Med.-Chir. Trans., vol. 80; New Orl. M. and S. Jour., Jan., 1898.

² Jour. Am. Med. Assoc., Dec. 4, 1897.

H. Langley Browne¹ cured a case of traumatic **aneurysm of the internal maxillary artery** by ligation of the common carotid artery. The man was kicked by a horse and received a punctured wound of the right cheek. On admission, besides the cheek-wound, he had a scalp-wound, and was laboring under cerebral concussion. He was bleeding from the wound of the right cheek, and from the right ear, nose, and scalp. The lower jaw was fractured in 2 places. Crepitus was also detected over the right malar bone. The patient was treated by recognized methods. A little over 3 weeks after the operation a collection of pus was evacuated from the neck. Eight days after the evacuation of the pus a profuse hemorrhage occurred from the neck-wound; the bleeding was controlled by packing. The right cheek had been swollen ever since the accident, and it was observed that this swelling was increasing and distinctly pulsated. On looking into the mouth it was seen that the soft palate was depressed and congested, and pulsation was observed. Two hemorrhages occurred from the mouth, and Browne ligated the common carotid artery, which cured the aneurysm. In the debate upon this case Jordan Lloyd reported a case of his own in which he had tied the external carotid artery, and he said that ligation of the external carotid was as easy as ligation of the common carotid, and much safer. Ashhurst thought that in Browne's case, in which the parts about the aneurysm were infected, it was best to tie the common carotid, and so avoid the area of infection.

Dollinger² reported the case of a man, 32 years of age, in whom, 4 months ago, he had **excised an external iliac aneurysm**. The aneurysm had existed for 2 years, and no traumatic cause was discoverable in the history. It was found that a collateral circulation existed. Digital compression caused so much pain that it was abandoned. The author did not advise the Hunterian operation, fearing secondary hemorrhage, and knowing that in this procedure the artery cannot retract. An incision was made parallel to Poupart's ligament, the peritoneum was raised, and the aneurysm was pushed forward. The vessel was ligated 1 in. above the aneurysm. The femoral was ligated and the sac was removed. The patient completely recovered.

Thomas S. K. Morton³ presents a study of **transperitoneal ligation of the iliac artery**, reports 7 new cases, 1 of which is his own, and gives the statistics of 29 operations. Of the 29 cases, 22 recovered and 7 died; 17 operations were performed by 15 American surgeons. It was Dennis's paper in the *Med. News* of Nov. 11, 1886, which placed this operation upon an enduring basis. Of the 7 deaths, not 1 was due to abdominal complication. In 1 case partial obstruction of the bowels followed the operation, and it was necessary to reopen the abdomen; but this patient recovered. The low mortality is remarkable when we recall the fact that in many of these patients it was necessary partially to eviscerate before the introduction of the Trendelenburg position. Since 1890 there have been 17 operations, with 3 deaths. In 5 cases the common iliac was ligated, and of these 1 died, the death being due to gangrene. The first operation was by F. Lange, in 1883. There were 9 cases of ligation of the internal iliac artery, and of these 2 died. The first operation was performed by Leroy McLean, in 1872; 2 were double simultaneous ligations, 1 by Dennis for double gluteal aneurysm, and the other by Kelly for uncontrollable hemorrhage during hysterectomy. There were 15 cases of ligation of the external iliac artery, and of these 4 died. Two of the deaths resulted from subsequent gangrene of the extremity. The first operation was

¹ Brit. Med. Jour., Oct. 9, 1897.

² Ibid., from Pester. Med.-Chir. Presse, No. 49, 1897.

³ Jour. Am. Med. Assoc., Jan. 15, 1898.

performed by Richardson, in 1886. The writer is convinced that the general opinion among surgeons is in favor of the transperitoneal route for all ligations above the lower portion of the external iliac. When the lower portion of the external iliac can be tied by the extraperitoneal method this route is still preferred; but if the disease involves tissue above Poupart's ligament, and in any case for higher ligation, almost all are in favor of the new method. The Trendelenburg position greatly facilitates the operation, as it renders evisceration unnecessary and obviates the need of making strong pressure by retractors. The incision for low ligation should be lateral; the semilunar line has been the favorite site up to the present time for reaching the external iliac, but it seems probable that the operation can be as well performed through the adaptation of McBurney's muscle-splitting incision. In cases following ligation of the internal or common iliac the median incision is best. After the performance of the ligation the peritoneum over the sheath of the vessels should be sutured, if the condition of the patient admits of it, although this procedure is not essential. The author reports 7 cases.

Robertson¹ reports a case of **traumatic aneurysm of the ulnar artery in the palm**, which was cured by tying the ulnar artery above the wrist. There was a painful spot in the hypothenar artery of the left hand, and at this spot there were bulging, pulsation, and decided pain. There was no syphilitic history, and the influence of traumatism as the cause was clear, the man having bruised his hand. Robertson ligated the left ulnar artery and completely cured the case, though he admits that extirpation of the aneurysm would probably have been the preferable operation.

Joseph Griffiths² records a case of **spontaneous aneurysm of the ulnar artery in the palm**. Excision of the aneurysm was performed and the patient recovered. The author believes that spontaneous aneurysm of any small artery is extremely rare. But few cases of spontaneous aneurysm of the ulnar have been reported. Griffiths has found 6 on record. In this patient the swelling was on the inner part of the hypothenar eminence of the right hand. It pulsed strongly, but was not tender. At times there was pain on the inner side of the forearm, and generally there was numbness of the little, ring, and of the ulnar side of the middle finger. This swelling throbbed distinctly. An incision was made and the sac extirpated; the patient was thoroughly cured. In considering this case the author shows that there had been no traumatism, no sudden sprain, no evidence of any increased blood-pressure, no widely distributed arterial disease, and no valvular disease of the heart. Examination of the aneurysm showed that this case was an instance of subacute localized endarteritis deformans, with extension into the muscular fibers, and almost complete disappearance of muscular fiber and elastic membrane. The author believes that extirpation is the proper operation in all these cases, as by it all of the diseased artery is completely removed. Some surgeons have been deterred from adopting this method of operation because they fear septic infection and hemorrhage, but with Esmarch's tube and modern cleanliness there need be no apprehension of either one or the other. Ever since the time of John Hunter it has been believed that in a case of aneurysm the wall of the artery is diseased for some distance from the dilatation. That this occasionally happens is undoubted; but in many instances the vessel, even near the aneurysm, is healthy, and the view that the artery is extensively diseased should be accepted only when there is positive evidence of general disease of the arteries. The author maintains that one great advantage of having the aneurysm in his case was that the patient was freed from the contracting blood-

¹ Brit. Med. Jour., Dec. 4, 1897.

² Ibid., Sept. 11, 1897.

clot, which clot, because of the close relation of the ulnar nerve to the wall of the sac, might have kept up injurious pressure for months.

Robert Bramwell¹ reports a case of spontaneous **aneurysm of the radial artery** in the tabatière, for which excision of the sac was performed, with success. The wound healed by first intention, and within a month the patient was cured. The author calls attention to the rarity of spontaneous aneurysm of the radial artery and the absence of any assignable cause for the formation of aneurysm in this case. His opinion is that the aneurysm was due to embolism. He strongly advocates excision in most cases in preference to other methods.

DISEASES OF THE LYMPHATIC SYSTEM AND THYROID GLAND.

Hammerschlag² reports 6 cases of **tuberculous lymph-glands** treated with injections of from 5% to 10% iodoform-glycerin emulsion. In private practice and among the well-to-do he precedes the injections by general tonic treatment. His results were remarkably rapid and satisfactory. In some cases injections were made in the periphery of the glands, and in some were intra-glandular. The large lymph-glands yielded rapidly to treatment, without leaving a scar. He uses 1 to 2 c.c. of the emulsion, first on one side, and a week later on the other, under local anesthesia.

E. Fuller³ lays great stress on the importance of a **correct diagnosis** in diseases of the **inguinal glands**. The possibility of direct traumatism should always be kept in mind, as well as senility and general debility. The glands are involved in gonorrhea to a greater or less extent, and suppuration may supervene. They are also invaded in chancroidal inflammation, and usually suppurate. Glandular enlargement may occur as an early or late manifestation of syphilis. A tuberculous process may bear a resemblance to syphilis, but can be differentiated by the effect of internal medication. In the diagnosis of tuberculous inflammation one should look carefully for other signs of this disease. In the subacute stage marked enlargement is found. In the chronic form the glands are dotted with minute abscesses which coalesce. In the treatment one should try rest and attempt to heal the primary affection. If suppuration threatens, cooling lotions and rest in bed are recommended, or, if ineffectual, one should operate. Gumma should never be opened. In tuberculous inflammation with sinuses, local treatment with iodoform-emulsion injections and the internal administration of tonics is advised. The author uses two cannulas when flushing a suppurating gland. Through one he injects 1:5000 bichlorid solution, and through the other the iodoform emulsion. Where a sear is not objected to by the patient, he prefers incision and drainage. Enucleation is only necessary when the glands are tuberculous.

H. W. Cushing⁴ reports a case of **suture of the left thoracic duct**, the injury having been inflicted during an operation for removal of the supra-clavicular glands for carcinoma. Seven cases are collected from the literature, in but 2 of which was an attempt made to close the opening by suture. In several of the cases injury was unsuspected until the wound broke down and a chylous fistula formed. In all the cases recovery followed, either by the use of a tampon, by clamping, or by suturing at the time of injury. It has been shown that the duct may ascend as high as 5.5 cm. in the neck above the sternum. In the author's case the opening was closed by fine silk, and the edges of the

¹ Lancet, Oct. 23, 1897.

² Jour. Cutan. and Gen.-Urin. Dis., Dec., 1867.

³ Deutsch. med. Woch., Dec. 23, 1897.

⁴ Ann. of Surg., June, 1898.

wound were inverted; and he concludes that when working near the duct all visible lymphatic vessels should be tied. If the duct is injured, suture is the ideal method of treatment; but if suture is impossible and the wounded vessel is a large one, it is safest to treat it as though it were the main and only channel, by placing a provisional ligature about the duct on the proximal side of the wound, leaving the ligature untied, and controlling the leakage by a gauze tampon. This acts as a safety-valve and allows chyle to escape, if the pressure in the duct becomes too great and a collateral lymphatic circulation is difficult to establish. A meager diet should be given. If leakage becomes uncontrollable and threatens starvation, the ligature should be tied, hoping for readjustment of collateral circulation.

The treatment of **exophthalmic goiter by resection of the cervical sympathetic** is advocated and a case reported by Gérard-Marchant and Abadie.¹ The theory upon which they base the operation is that exophthalmic goiter is due to excitation of the vasodilators of the cervical sympathetic, and that accident following either entire or partial removal of a goiter is due to derangement of the sympathetic nerves, and not to the absorption of thyroid secretion. The hemorrhage also, which is frequently such a dangerous attendant of operations, they believe to be due to the condition of the blood-vessels resulting from disturbance of the vasodilator nerves. In the case reported the exophthalmia was marked, and the cervical sympathetic was removed from both sides. The operation was not followed by disagreeable symptoms. Dilatation of the pupils was noted, but no effect on respiration or heart-action was observed. At the end of 10 days the eyelids could be closed completely over the eyes.

Chaufaud and Quénu² report a case of Basedow's disease operated on by **Jaboulay's method**, both superior cervical ganglia of the sympathetic being removed. In their case the operation apparently had no influence upon the disease, the exophthalmos and goiter both remaining in practically the same condition, which proves that this operation is not always curative.

Jaboulay³ has **stretched the pneumogastric nerve** in cases of exophthalmic goiter with severe cough, and he alleges with benefit. The operation arrests laryngeal spasms.

The surgical treatment of exophthalmic goiter formed one of the subjects for discussion at the Surgical Congress held in Paris.⁴ Jonnesco, of Bucharest, quoted statistics of Allen Starr, who collected details of 190 cases of thyroidectomy for Graves's disease, of which 74 were cured, 45 relieved, 3 unrelieved, and 33 died, giving a mortality of 17.36%. Jonnesco did not advocate removal of the thyroid, stating that the successful cases were not typical cases of Graves's disease, and that in the truly typical cases the mortality was much higher than the figures given. Doyen, of Paris, strongly advised thyroidectomy, and said he would perform resection of the sympathetic only after the former had failed. Kocher and Rydygier reported results of ligation of the thyroid arteries. Kocher had operated 34 times, ligating 3 of the arteries; 31 cases were cured and 3 died. Rydygier operated 22 times, ligating 4 arteries; 20 cases were cured and 2 unrelieved. Faure, of Paris, has excised the cervical sympathetic 3 times, with 1 death, and advises bilateral removal, with a delay of a few days between operations. Jonnesco reported 3 cases of simple section of the sympathetic, all successful; partial resection 12 times, with 11 cured and 1 unrelieved; and entire bilateral resection twice, with good results.

¹ Presse méd., July 3, 1897.

² Ibid.

³ Lyon méd., Apr., 1898.

⁴ Rev. Chir., Nov., 1897, Supplement.

F. J. Shepherd,¹ in a paper on the **surgery of bronchocele**, reviews the literature and describes the various operations from the time of Galen to the epoch-making report of Kocher, in 1895. The operation of enucleation which the author performs is as follows: An incision 3 or 4 in. long is made directly over the tumor. After cutting through the skin and fascia the depressor muscles of the thyroid cartilage are reached, but these are so thin as hardly to be noticed if the tumor is large. The anterior jugular vein is divided between 2 ligatures at this point. The gland is reached as soon as the depressor muscles are cut. It resembles muscle and bleeds when cut. A small incision is made through the gland-tissue, when the capsule will be seen, being bluish-white in color. When the capsule is reached the incision is enlarged, and the tumor enucleated. If it is a cystic case, the cyst should be punctured to relieve tension and prevent hemorrhage. As the cyst is delivered it is peeled off from the gland-tissue, any vessels being tied; the operation being thus extracervical. If there are several cysts, one can be reached through the bed of the other. All bleeding points are secured, and the cavity packed with iodoform-gauze for 24 hours, when the packing is removed and the opening closed with silkworm-gut. The cavity and the wound are never cleansed, a dry dressing is applied, and the patient encouraged to get up and move about, the cases averaging 6 days in the hospital. If the wound looks normal, no attention is paid to pulse or temperature. Shepherd has operated 30 cases by this method, without a death.

Rodocanache² reports 4 cases of **goiter** removed by operation, and comments on certain dangerous symptoms which may follow. Three of the cases were under the care of Horsley and 1 under the care of Heath. The annoying symptoms are restlessness, rapid pulse and respiration, accompanied by considerable mental activity, and often fatal result. The dyspnea does not depend on obstruction, nor the pulse and respiration on hemorrhage, these conditions being due to excess or deficiency of thyroid secretion. The researches of Gull, Ord, and Kocher have shown that myxedema may follow extirpation of the thyroid gland, but the apathy and dulness, slow pulse and respiration of this disease bear no resemblance to the symptoms following thyroidectomy. The rapid pulse, easily embarrassed breathing, and nervous instability of exophthalmic goiter are familiar. Murray's view is that the thyroid in exophthalmos compares with the changes which occur in an effort of compensation when part of the gland has been removed. The changes consist in the formation of new alveoli, folding of the alveolar walls, which increases the epithelial surface, and a change of the epithelial cell from cubical to columnar, changes which indicate that the gland is working at high pressure. In exophthalmic goiter an increase of secretory tissue is found and the cells are columnar, which is the histologic appearance of compensatory hypertrophy. Clinical evidence supports this view, for in the latter disease improvement occurs when the gland is partly excised or some of its vessels ligated. Carless believes the belladonna-treatment of exophthalmos relieves by diminishing the thyroid secretion. In 2 of the reported cases cysts were removed from the thyroid and a considerable quantity of fluid escaped into the wound, and was probably taken into the lymphatic circulation, and the symptoms noted followed. The author concludes, therefore, that there is an intimate relation between cases of this character and exophthalmic goiter due to an excess of thyroid secretion in the circulation. The question can only be settled by experiment, and he urges the importance of guarding against these serious symptoms by taking as much care to prevent the contents of a thyroid cyst entering the wound as a surgeon takes in

¹ Practitioner, Aug., 1897.

² Lancet, Oct. 9, 1897.

dealing with a fluid tumor of the abdomen. Should the symptoms arise, morphin hypodermically promises the best results.

Wormser,¹ in discussing the operative treatment of goiter, claims that the advantages of **thyroidectomy** are sufficiently great to counterbalance its possible dangers; while intraglandular enucleation or strumectomy is not often indicated. The author's experience in Kocher's clinic at Berne has been very great; and he describes the operation of thyroidectomy as Kocher now does it, and states that it affords the best conditions for establishing hemostasis and avoiding injury to the recurrent nerves, and it leaves a piece of the normal glandular structure. The disfigurement is slight and relapse is impossible. In strumectomy the hemorrhage is often severe, with danger of secondary bleeding and infection, and, as statistics have shown, recurrence is more frequent than after thyroidectomy. Wormser advises the latter operation in cases of—1, malignant tumor of the thyroid gland; 2, acute and chronic strumitis; 3, parenchymatous goiter, diffuse hypertrophy of the gland; 4, polycystic goiter; 5, goiter with disseminated foci. It is contraindicated in cases in which no normal thyroid tissue is left. Strumectomy may be done in cases of—1, unilocular cystic goiter; 2, isolated nodules enclosed in normal tissue, if the gland can be removed without much bleeding; 3, morbid deposits in immovable goiters.

A **fatal case of thyroidectomy** in a girl, 15 years old, is reported by Paul.² The goiter was rather large, and one lobe and the isthmus were removed; about 24 hours later symptoms resembling Graves's disease developed, which increased in severity until death, 2½ days after the operation. Small doses of morphin were given several times. At the necropsy the wound showed lack of healing-action, and was filled with a watery fluid. The lungs were slightly congested; the other organs were healthy, except the liver, which was very fatty and nodular from idiopathic cirrhosis. The author concludes that death was not due to the condition of the liver, but rather to the absorption of an excessive amount of thyroid secretion. A subsequent case was relieved by packing the wound with gauze, which absorbed the secretion. Paul suggests that ligation of the severed isthmus and avoidance of undue handling of the gland would avert danger.

Reverdin³ reports a case of removal of a sarcoma of the thyroid gland. There was great dyspnea, which compelled operative interference. Complete removal was prevented by adhesions, hemorrhage was great, and the patient succumbed on the following day. The growth was sarcoma. An important diagnostic sign of malignant tumor is dysphagia, although this was not complained of by the patient; yet the autopsy showed the growth extending backward between the trachea and esophagus, limiting the mobility of the latter. Other symptoms are edema of the thoracic walls and upper sternal region, with radiating pains and dyspnea. No external edema of the parietes was seen. Operation showed no thrombosis of the veins; the jugular was free, but the carotid was invaded by the growth. Recurrent radiating pains toward the ear, rapid emaciation, and marked interference with respiration, due to paralysis of the vocal cords by compression, were prominent symptoms. When this disease is well advanced and symptoms become marked, the author states it as his belief that removal is dangerous and not likely to arrest the disease.

Bruce Clarke⁴ reports a case of **gumma of the thyroid**, with the following history: Four years previously a gumma of the right arm had

¹ Rev. de Chir., Apr., 1898.

³ Jour. de la Suisse Romande, Dec. 20, 1897.

² Brit. Med. Jour., Jan. 1, 1898.

⁴ Lancet, Aug. 14, 1897.

disappeared during the administration of potassium iodid; but the treatment having been discontinued, 3 gummata of the face appeared, which also disappeared under the same treatment. Three months later a gumma appeared on the anterior aspect of the neck, which was partially relieved under antisyphilitic treatment. Six months later the swelling began to ulcerate, and the patient treated it with poultices. There had been no pregnancy in 13 years of married life, and no history of syphilis, other than the symptoms above mentioned. Dysphagia developed before admission, followed by dyspnea, and the ulcer presented a typical gummatous appearance. The symptoms becoming aggravated a laryngotracheotomy was performed, it being necessary to cut through $1\frac{1}{2}$ in. of hard gummatous material before the trachea was reached. Potassium iodid was given in increasing doses, reaching 5ss t. i. d., and the gumma rapidly diminished, and she was discharged apparently cured, except for a husky voice due to involvement of the cords. The rarity of gumma of the thyroid, or of any gland-tissue, makes this case worthy of record.

Bérard¹ discusses so-called **thyroid fever**, after studying a number of observations. The characteristic features consist in a rapid rise of temperature, usually on the day following operation, with daily morning remissions, and termination either by crisis or lysis. Infection or acute myxedema is in a measure responsible for the phenomena, which are due to increased absorption of the glandular secretion.

DISEASES OF THE MUSCLES AND TENDONS.

W. S. Forbes² describes the **liberation of the ring-finger of musicians**, by dividing the accessory tendons of the extensor communis digitorum muscle. He has performed this operation 466 times, with invariable success. His method is strongly to flex the fingers, by which the 2 accessory tendons are brought down to the angle made by the first row of phalanges with the metacarpal bones, and are thus rendered tense; an incision is made with a bistoury, and with the edge turned upward the knife is carried beneath the restricting tendon, which is then divided. The puncture is covered with collodion.

Following incised and lacerated **wounds of muscle** function is frequently lost, and the **restoration** of this is the subject of a paper by Knott.³ A lacerated wound of a muscle should be sterilized with unusual care, cleared of all shreds of tissue, the edges trimmed and accurately sutured. If the destruction of tissue has been too great the gap may be bridged with catgut sutures, which furnish a framework along which the connective-tissue cells may find their way. If only 1 end can be found, suture it to a muscle with the same function. Hernia of muscle, which is recognized by unusual prominence of the muscle during contraction, is prevented by carefully suturing the fascia. If bony deposits occur in the muscle, they should be removed. A ruptured tendon should be accurately sutured with chromicized gut, by Le Fort's method. Wounds of tendons are frequently overlooked, but should be sought for, and when found the ends should be approximated and sutured; or, if a part of the tendon is destroyed, they should be lengthened by Czerny's method. If this is impossible, an animal tendon should be transplanted or the peripheral stump of the tendon should be sutured to a neighboring tendon with similar function. If a tendon has been destroyed, an adjacent tendon with

¹ Presse méd., Dec. 29, 1897.

² Phila. Med. Jour., Jan. 15, 1898.

³ Internat. Jour. Surg., Aug., 1897.

the same action may be split longitudinally and a portion sutured at the insertion of the destroyed tendon, thus restoring the function.

Féré¹ discusses the etiology of **Dupuytren's contraction of the palmar fascia**, and calls attention to the symmetry of lesions. Their most frequent characteristic is that they are bilateral, which he thinks is in favor of a constitutional rather than an external agency. Rheumatism and herpes often precede the contraction, although diabetes is sometimes found in the history. Dreyfus-Brisac pointed out the association of trophic lesions in diabetes with this affection. Kirby, Paget, and Tuffier have shown that in gouty and arthritic patients induration of the fibrous tissue of the penis frequently accompanies Dupuytren's contraction; and the observations of Jonathan Hutchinson are confirmatory, as he has carefully described this condition, the dorsum of the penis being indurated with downward curvature, rendering erection painful and coitus impossible. Contraction of the palmar fascia is also found associated with diseases of the nervous system, locomotor ataxia, hysteria, and epilepsy. Traumatism is undoubtedly a predisposing factor. The contraction usually begins at the base of the ring and little fingers, although the base of the middle finger is not uncommonly the seat of trouble. The index-finger is rarely, and the thumb more rarely, affected.

Ganguee² reports a case in which displaced **peronei tendons were re-placed by operation**. Considerable violence, which ruptures the external annular ligament of the ankle, is the cause of the escape of the tendons from their groove behind the external malleolus. If they are replaced at once and the leg fixed in plaster recovery usually occurs; but where the displacement is chronic this is ineffectual, and it was in such a condition that the author operated. An incision 3 in. long was made along the posterior edge of the fibula and to the tip of the malleolus. A thickened bursa was found over the tendons, which were flattened out over the malleolus. The tendons were replaced, and a flap of periosteum and superjacent fibrous tissue, 3 in. in length and wide enough to cover the tendons, was turned backward and sutured with silk. A plaster cast was kept applied for two months, with a perfect recovery following.

Retrocalcaneal bursitis, or achillodynia, is studied, with report of 6 cases, by J. Chalmers DaCosta.³ Albert, of Vienna, called attention to this affection in 1892, and believed it was caused by a partial rupture of the tendon or evulsion of the bone; but many cases depend on inflammation of the bursa with thickening, and the formation of osteophytes. It has been shown that the walls of the bursa contain cartilage from which these bone-cells arise. Pain in the heel during attacks of gonorrhea has been noted, and in the case reported by Da Costa, although the fluid did not contain gonococci, yet the toxins might have set up the inflammation. Flat-foot was a noticeable feature in the cases reported. Other determining causes are influenza, scarlatina, caries of the os calcis, and overexertion. Syphilitic influence has not been determined, although gout and rheumatism may be influential. In cases of acute bursitis the walls are not much thickened, fluctuation is often detectable, tenderness is developed by pressure and passive motion, and the heel is broader than natural. In chronic cases the heel is broadened, there is great pain when rising on the toes, and relief is prompt when put at rest. X-rays will show osteophytes, if any are present. In making a differential diagnosis between thecitis of the tendo Achillis and flat-foot, remember that in the former pain is located above the upper surface of the os calcis, there is grating on motion, and

¹ Rev. de Chir., Oct. 10, 1897.

² Birmingham Med. Rev., Oct., 1897.

³ Phila. Med. Jour., Mar. 12, 1898.

the heel is not broadened. In flat-foot there is pain on walking, which is relieved by rest, and the heel is not broadened. Inunctions of ichthyol, rest, and compression may cure acute cases of bursitis, but aspiration or incision may be necessary. If there are osteophytes they must be removed, which is done after opening the bursa. The bursa may be opened by splitting the tendon by a longitudinal posterior incision, or by cutting across by a zigzag incision, followed by sutures.

The suture of **ruptured muscle** by wire sutures, in a similar manner to fractured patella, is advocated by Lucas-Championnière.¹ In his case there was rupture of the quadriceps tendon above the patella, accompanied by lacerated muscle, and effusion of blood into the thigh, due to traumatism. After exposing the insertion of the quadriceps he found only a few fibers left, while the muscle was retracted and torn. The synovial sac of the knee was torn and the joint filled with blood. He inserted two silver-wire sutures from the patella to the triceps tendon; but some time after the patient left the hospital, and following a convulsive seizure a return of the former symptoms was noted. A second operation was done, and it was found that the wires had become untwisted. Championnière modified the first operation by passing a piece of silver wire transversely and above the torn muscle, so that when the sutures were introduced there was a bony base below and a metallic one above to take off the strain while the parts were approximated. Healing was rapid, and 7 months later walking was perfect, fibrous union having taken place.

The condition known as **housemaid's knee** is operated on in a simple and efficient way by Hoffman.² His method is to withdraw the fluid from the distended bursa, scarify the interior walls, apply pressure, and obliterate the cavity. This method has the advantages of occupying but little time, requires no anesthetic or sutures, and there is no interference with locomotion. Two failures occurred from insufficient scarification and incomplete evacuation of the fluid. Care should be taken to reapply the bandages when they become loose. The author claims that success will follow in all cases where these rules are observed.

BONE-DISEASES AND FRACTURES.

C. T. Dent³ writes on **periostitis following muscular exertion**. Sir James Paget wrote an article upon periostitis after strains, and in it refers to a previous article by Solly. This condition is frequently not diagnosed. After excessive use of the muscle it is rare for healthy muscular tissue or tendon to suffer harm. The intermuscular planes or the tendon-sheath are much more apt to be affected. It is well known that overuse of the forearm-muscles may cause that condition of tenosynovitis known by the name of "washer-woman's wrist," but this is a condition in which the synovial sheaths alone are involved. Dent is not discussing such disorders, but is considering periostitis due to excessive or unnatural use of muscles. The ordinary effect of the constant and vigorous use of muscles is a certain amount of bony hypertrophy at the points of attachment. The dragging on the muscular attachment causes a vascular condition of the periosteum and the formation of extra bone, the condition being hypertrophy, and not inflammation. After a severe exertion, such as an Alpine ascent, in a person unused to mountain-climbing, there is a sense of great stiffness in the muscles, especially in the extensors of the thigh. A careful examination will show that there is tenderness of the bone at the

¹ Jour. de Méd., Apr. 25, 1898.

³ Practitioner, Oct., 1897.

² Med. Rev., Jan. 1, 1898

point of muscular attachment. A practised person, however, will suffer but little inconvenience from this mountain-climbing. This is what Dent means by unfair use of the muscles. A common example is the periostitis that follows overuse of the extensors of the thigh in football-players. This is generally seen in boys. There are pain about the tubercle of the tibia and some fulness. It is found impossible to raise the right leg in going up stairs, and there is usually some effusion in the knee-joint. Local heat to a slight degree may be noticed. This condition is frequently mistaken for disease of the knee-joint. The fulness and tenderness are chiefly over the tubercle of the tibia. Jarring, turning, or twisting the knee causes no pain; but if the patient is told to straighten the leg and the surgeon resists the effort, there is decided pain. The best remedy for such cases is a series of flying blisters. These cases are most common in those who have a bad style of play. Scientific players rarely suffer from "football-knee." In putting the weight, if the exertion is not scientifically made, serious results may follow. If the athlete depends almost entirely on the arms for projecting the weight, the humerus may be fractured above the attachment of the deltoid. If he is properly taught to spring from the thighs and legs and to raise the body at the moment he hurls the shot, he can make many throws without risk; otherwise but a few throws cause the arm-muscle to give way. Periostitis of this sort may occur in housemaids, the periosteum corresponding to the origin of the great pectoral from the chest. It is produced by sweeping. Most of these patients suppose that they have a tumor of the breast. There are fulness over the affected area, tenderness, and local rise in temperature. Throwing the great pectoral into action gives rise to pain. In some cases the clavicular origin of the great pectoral alone is affected. Dent has seen a similar case due to working upon a sewing-machine. Very little treatment is required in these cases; and, in fact, they will get well if relieved from the causative form of work.

Jaboulay¹ reports a case of **progressive prognathism** in which the patient was unable either to eat or speak. This case was completely cured by the removal of one condyle; the esthetic result would have been more perfect had the other condyle also been removed, but the patient refused to permit this.

George Heaton² records a case of quiet **necrosis of the femur**, and calls attention to the fact that this disorder may closely simulate sarcoma. His patient was a girl of 11, who had had a spontaneous fracture of the right thigh. Five months later she developed pain, and later still swelling of the femur. The patient was believed to be suffering from a sarcoma. Heaton decided to amputate, but an exploratory incision was first made down to the mass. It looked like an ossifying sarcoma. Before amputating a chisel was forced through a considerable thickness of dense bone, and entered a cavity containing a sequestrum. Amputation was, of course, abandoned. This patient recovered. Attention was first called by Sir James Paget and the late Marrant Baker to quiet necrosis, or necrosis without suppuration. It is a rare disease, and more than once amputation has been performed for this condition, under the belief that the patient was suffering from malignant disease. In the above case the chronic enlargement of the lower end of the bone, the spontaneous fracture followed by nonunion, the absence of fever, and the absence of all signs of suppuration, led the surgeon to assume that he was dealing with sarcoma. The diagnosis between these 2 conditions is a matter of great difficulty. There is no pathognomonic sign, and we can only accurately determine the condition by incision into the bone, and, if need be, by a microscopic examination of a portion of the tissue removed.

¹ Presse méd., Apr. 9, 1898.

² Birmingham Med. Rev., Mar., 1898.

Charles L. Gibson¹ makes a report on the condition of a case of **implantation of bone-chips** in a cyst of the head of the tibia. The patient was a male, aged 18. In October, 1889, a cyst of the head of the tibia was opened with a chisel and the cavity was packed with sterile gauze. Two weeks later the cavity was filled with bone-chips. The part healed satisfactorily and the patient got about. Almost 5 years later he came into the hospital again with the parts acutely inflamed, and stated that some weeks before a sinus had formed and particles of bone had come away. The wound was opened, and about one-half the original amount of bone-chips was removed. They presented exactly the same appearance as when they were implanted, and at no place was there evidence of any absorption. They were buried in a mass of loose granulation-tissue and detritus. The cavity was curetted and treated by Neuber's operation, and the patient recovered. This case is interesting as showing at what a late period an apparently aseptic body can set up disturbances. As there was practically no bone produced in this case, it is possible that the ossifying granulation-tissue lacked the chemical constituents necessary for the solution of the bone-chips. The general belief is that these foreign substances do not themselves become ossified, but promote the generation of bone, and as the new bone forms the foreign substance is absorbed.

Morton² claims, after a study of the skiagraphs of 6 cases of **genu valgum**, that there is no rachitic curvature of the lower end of the femur and no elongation of the internal condyle, but that the deformity is due to a bending out of the tibia below its head and of the fibula above its middle. The author thinks that, instead of Macewen's operation, we should correct this deformity by dividing the tibia and the fibula, and he has accomplished this successfully in 2 cases.

W. Herzog and P. Krantzig³ discuss **acute osteomyelitis of infancy**. They state that this condition may follow any infectious disease. It is a much commoner sequel of infectious diseases than is usually supposed. In the case of a child, 17 months old, in which the infection was due to scarlet fever, the autopsy showed infection of the epiphysis of the right humerus, 4 ribs on each side, and the right femur. There were also nephritis and pneumonia. Cultures taken from the shoulder-joint showed the presence of *Staphylococcus pyogenes aureus*. Many surgeons have been struck with the similarity between acute pseudomyelitis and pyemia; and Kraske maintains that pseudomyelitis is in reality a form of pyemia. The authors say that though pyemia and pseudomyelitis are due to metastasis, and usually to staphylococci, they differ clinically and pathologically. In the acute pseudomyelitis of infancy the epiphysis is the primary seat of trouble, and the lesions, as a general rule, are multiple.

Duebar⁴ reported an interesting case in which he **transplanted bones from a dog**. A child, 10 years of age, was laboring under tuberculous disease of the wrist-joint, and the surgeon removed 5 of the carpal bones, curetted the ends of the metacarpi and the articular surface of the radius, and filled the cavity with 5 pieces of cartilaginous bone which were cut from the femur of a freshly killed dog, the animal being but a week old. The wound healed and the patient was lost sight of; but 6 years after the operation she again came to the hospital, and a skiagraph was taken. The bones were found to be intact and surrounded by new connective tissue. The wrist is movable and gives no pain, and the girl can sew and knit with the greatest ease.

¹ Ann. of Surg., Aug., 1897.

³ Münch. med. Woch., Apr. 5, 1898.

² Brit. Med. Jour., Apr. 16, 1898.

⁴ Deutsch. med. Woch., No. 52, 1897.

Fractures.—W. J. Mayo¹ considers the pathologic diagnosis of **oblique fractures**. The obliquity of the fracture is the most important feature in the diagnosis and future of the case, and when an oblique fracture exists deformity is the rule. Such injuries constitute the bulk of the fractures of adult middle life, and they are far harder to adjust than are the greenstick and transverse fractures of childhood and the pipe-stem fractures of old age. In these fractures, even if the surfaces are well adjusted, there is a disposition to overlap, and any force which tends to shorten the limb, whether it be pressure or muscular contraction, produces displacement, with consequent shortening. Oblique fracture is usually due to indirect force, and shortening occurs. Such shortening is a most unfortunate thing in the femur, $\frac{3}{4}$ in. shortening causing a limp, a pelvic droop, and a compensatory spinal curve. In the upper extremity, if the joint be not involved, a slight degree of shortening is not so material. Macewen has shown that true bone originates from any or all parts of the bone, medullary canal, and periosteum. Defective callus or too abundant callus may itself cause displacement and union with deformity. In paralytics and those suffering from certain constitutional troubles difficulty in repair is apt to exist. In rheumatic individuals chronic rheumatoid arthritis, especially of the hip, may occur, deformity resulting, for which condition the surgeon is absolutely blameless. The influence of chronic inflammation of bone, especially near the epiphyseal line, upon bone-growth has been noted by Senn. Mayo has seen a tibia elongated 1 in. by a central abscess in a growing bone. It is a well-known fact that there is frequently asymmetry of bone-length in otherwise normal individuals, and the frequency of such abnormalities should be borne in mind in measuring the limb, and also the possibility of the existence of a deformity due to some former injury. The ends of oblique fractures not infrequently are entangled in the soft parts, and union is interfered with. Muscular action leads to displacement of the fractured ends and causes shortening, especially in the femur. The femur requires a long time for solid union. Cheever states that he has known a fracture in which the femur at 6 or 8 weeks showed but $\frac{1}{2}$ in. shortening, but by injudicious use the ends gradually slipped, from pressure upon the callus, and gave an ultimate shortening of 2 in. or more. In children union is more rapid than in adults. Dawbarn says that until the eighth or tenth day union is so imperfect that it is possible easily to change the position of the bone-ends. If it becomes necessary to rebreak a fractured bone, repair will be slow. The author then considers some of the signs of fracture, and calls attention to the great value of a procedure devised by Gerster, in the diagnosis of fractures about the elbow-joint after swelling has taken place. An anæsthetic is administered, and a rubber bandage is slowly applied from the fingers to the shoulder. At the expiration of 15 minutes the upper turns are tightened to prevent the blood from entering the arm, and the lower turns are removed to a point above the joint. By manipulation of the now greatly reduced elbow an exact diagnosis is reached, and treatment is instituted. The swelling of the elbow is thus abolished, and an accurate diagnosis can be made. The author then calls attention to the value of the X-rays and of exploratory incision, but reminds us that careless use of the X-rays may give a picture in which the deformity is exaggerated. [We have employed Gerster's ingenious method of examination, and have found it most satisfactory.]

Buscarlet² writes on **modern methods of treating fractures**. He does not believe in complete immobilization alone, or in massage alone, but

¹ Jour. Am. Med. Assoc., May 28, 1898.

² Rev. méd. de la Suisse Romaine, Dec. 20, 1897.

employs a combination of immobilization with massage and passive movements. Those who completely immobilize obtain only straight limbs, but not free movement. Those who use massage alone, without thoroughly understanding how, cause enduring deformities. Biscarlet applies removable plaster splints, and as soon as there is a certain amount of union begins passive motion. The proper time at which to apply this varies with the seat of fracture, being earlier, for instance, in the wrist and shoulder than in the elbow, knee, or ankle. It is latest for the humerus and for the ankle. [We are glad that a caution has been issued regarding the use of massage, as we are persuaded that much harm can come from it if applied injudiciously.]

Labbé¹ thinks that in some fractures **immobilization** is absolutely necessary. For instance, in fractures near the middle of the long bones, and especially fractures at the lower third of the leg. If these are treated by massage, a false joint will almost certainly be formed.

John B. Roberts² notes the value of **subcutaneous tenotomy** as an aid **in the reduction of fractures**. The suggestion was made a good many years ago, but it is not employed as often as it should be. It is especially useful in some fractures of the tibia and fibula; for instance, in oblique fractures near the ankle, and it is also useful in fractures of the shaft. One who has cut the tendo Achillis in tibial fracture, in which the ordinary fracture-dressing seemed unavailing, will be sure to adopt this operation in future cases. The operation does not in any wise impair the future power and usefulness of the foot, and it obviates the necessity of using complicated appliances to overcome spasm of the calf-muscles. It is probable that tenotomy would be of use in fractures of the upper portion of the shaft of the femur when the psoas and iliacus flex and evert the upper fragment. In such a case open incision and inspection of the parts would be preferable to subcutaneous division here. The tilting of the inner fragment in some fractures of the clavicle could probably be avoided by subcutaneous tenotomy of the clavicular portion of the sternomastoid muscle. The upward displacement of the olecranon after fracture might be managed in the same way. There is a possibility that intraarticular operations for bringing together the fragments in transverse fracture of the patella may be avoided by a free tenotomy and myotomy of the quadriceps extensor. [We would not care to do myotomy for fractured clavicle or patella, and would greatly prefer to wire the fragments. Tenotomy is undoubtedly very useful in some fractures of the leg near the ankle.]

Joseph Ransohoff³ discusses the operative treatment of **irreducible subcutaneous fractures**. He speaks of how the death-rate from wound-infection after compound fractures has been lessened by modern methods. He thinks that 2 notable steps in advance in the treatment of simple fracture have been the employment of massage and passive motion, and overcoming shortening in some cases by tenotomy. Cases are met with in which anesthesia and tenotomy combined fail to reduce deformity, and in which they do not prevent an unsatisfactory result. We often see results that are far from good in fractures of the lower end of the tibia, of the shaft of the femur, of the lower epiphysis, of the femur, of the radius, of the elbow, and of the clavicle, and in some such cases it is eminently desirable to make an incision, expose the fracture, approximate the fragments, and suture them. In certain cases interference before union has resulted is preferable to the certainty of deformity, although the cases in which operation is indicated are necessarily few.

¹ Sem. méd., Dec. 29, 1897.

² Phila. Med. Jour., Mar. 5, 1898.

³ Am. Jour. Med. Sci., Oct., 1897.

The author then reports 7 cases on which he has operated. His conclusions are as follows: 1. "The conversion of a simple fracture into an open fracture is justifiable when other means to secure the best end-results fail. 2. In fracture of the diaphysis of the tibia, femur, humerus, or clavicle, in which insurmountable longitudinal displacement or axial rotation has taken place, immediate operation or mediate operation before definite union has occurred is indicated. 3. In epiphyseal separations, when reduction cannot be otherwise effected, an early operation is justified. 4. Fractures complicated with dislocations irreducible by other methods warrant operative interference. 5. The involvement of a joint, except probably in the case of knee and hip, does not, *per se*, militate against operation if this is otherwise indicated. 6. If extensive comminution is present, as in compression or crushed fracture, operation is contraindicated. 7. Special precautions against infection must be taken, in connection with which should be borne in mind the dangers of too firmly closing a wound and the advantage of temporary tamponade and secondary suture. 8. Reckless and indiscriminate resort to the operative relief of deformity in recent simple fractures is to be condemned, since there would be few fields of surgery, in the event of an unsuccessful intervention, in which the contrast could be greater between the good intended and the harm done."

C. B. Nichols¹ makes a plea for **operative treatment in certain fractures and dislocations**. He says that the following cases should be operated upon: 1. All cases in which the fragments cannot be easily placed in apposition and maintained there. 2. In all open, multiple, so-called compound fractures. 3. In old fractures where there is great deformity, with or without severe pain. 4. In all old ununited fractures. 5. In all dislocations that resist reduction by manipulation under an anesthetic without great injury to surrounding soft parts. He thinks that oblique fractures of the clavicle should in many cases be treated by operation.

James Porter Fiske² advocates the application of the **ambulatory method** in fractures of the leg in children. He refers to children from the time they just begin to walk up to 15 years of age. That this method was applicable to children was first brought to the mind of the author by the after-treatment in a case of double bowlegs, for which osteoclasis had been performed. After the operation each leg was put in plaster of Paris, extending well up the thigh. At the end of a week he went to see the patient, and was surprised to find him walking about. No harm resulted, and from that time Fiske has always had these patients walk from the seventh to the tenth day. In a fracture the earlier an ambulatory cast is applied the better, unless there is some contraindication. If possible, it should be applied before there is edema or effusion. It is well in most cases immediately to apply the plaster cast. In some cases the reduction of the deformity is difficult because of muscular spasm or obliquity of the fragments, and in these cases we administer an anesthetic and then reduce the deformity. The method of applying the ambulatory plaster-of-Paris cast is as follows: After deformity has been reduced an assistant holds the limb, the foot being flexed to a right-angle with the leg. The foot and leg are bandaged from the toe-tips to and around the tuberosity of the tibia with a muslin roller. The bandage may, if desired, be carried up upon the thigh. Over the muslin roller the plaster bandages are applied, the bandage being particularly strong about the ankle and around the tubercle of the tibia. No pad is used, the plaster exerting equal pressure at all points. It has been thought that when the tuberosity of the tibia is not well developed the plaster cast should not be applied to a child, as the effectiveness of the cast as a

¹ Phila. Med. Jour., May 28, 1898.

² Jour. Am. Med. Assoc., Dec. 18, 1897.

walking-splint depends upon how firmly it encircles and supports the end of the tibia. This view, however, is erroneous, as the author has successfully applied this dressing in a great variety of cases in which the tuberosity of the tibia was not particularly well developed. In the true ambulant method the patient walks on the injured limb without the aid of crutches, the weight of the body being transmitted from the tuberosity of the tibia to the upper circumference of the plaster cast. There are certain conditions which may prevent the early use of the walking-cast. Among these are abrasions, edema, marked effusion, or great obliquity of the fragments. If there is a compound fracture or an abrasion we must wait until assured there is no infection. When there is obliquity we should wait before applying the ambulant cast until the fragments are glued together in good position and ossification has commenced—that is, until the tenth day.

Charles L. Senn¹ writes on the **ambulatory treatment of fractures**, and reviews the literature of the subject. The method he prefers to use in applying it is practically the method of Dollinger. "First, the reduction of the fracture, and cleansing of the skin of the leg with soap and water. Then, with the foot fixed at a right angle to the leg, a flannel bandage is smoothly and evenly applied from the toes to just above the knee. This bandage is made to include beneath the sole of the foot a padding of 10 or 15 layers of cotton wadding, making a pad about $\frac{3}{4}$ in. thick when it is compressed by the moderate pressure of the flannel bandage. Over this is now applied the plaster bandage, from the base of the toes to just above the knee, especial care being taken that the application is made smoothly and somewhat more firmly than is the custom in the ordinary plaster cast. The layers of the bandage should be well rubbed as it is applied, with the view of obtaining the greatest amount of firmness with the smallest amount of material. The sole is strengthened by incorporating with the circular turns an extra thickness composed of 10 or 12 layers of bandage well rubbed together, and extending longitudinally along the sole. The bandage is applied especially firmly about the enlarged upper end of the tibia, and here it is made somewhat thicker. As it dries it may be pressed in, so as to conform more closely to the leg just below the heads of the tibia and fibula. The assistant, who stands at the foot of the table and supports the leg, makes such traction or pressure as is required to keep the fragments in proper position while the plaster is being applied. The operation requires about 20 minutes, and by the time the last bandage is applied the cast should be fairly hard. It is seen that when this cast has become hardened the leg is suspended. When the patient steps upon the sole of the plaster cast the thickness of the cotton beneath the foot separates the sole of the foot so far from the sole of the cast that the foot hangs suspended in its plaster shoe. Thus the weight of the body which would come upon the foot is borne by the diverging surfaces of the leg above the ankle. The chief of these is the strong head of the tibia. A lesser role is played by the head of the fibula, and the tapering calf in muscular subjects."

In fractures of the thigh the best method is to use the long hip-splint of Taylor, together with a high sole upon the well foot, and crutches. The advantages claimed for the ambulatory method are the brief time it is necessary to keep a patient in the hospital, the earlier date at which a fracture unites, the small amount of muscular atrophy and joint-stiffness, the greater functional usefulness of the leg, the avoidance of primary swelling and secondary edema, and the lessened amount of callus. In drunkards and in patients with delirium tremens the treatment is much safer than the old

¹ Boston M. and S. Jour., Feb. 3, 1898.

method, and in aged people it lessens the danger of hypostatic pneumonia. There is greater comfort given by this method than by any other, the general health is conserved, and time is saved to the business man, who will lose but about 7 days after a fracture of the leg.

Scudder says that the above-mentioned advantages are claimed for the ambulatory treatment by its adherents; but before this method can be generally adopted it must be demonstrated that it is safe, that it will give better functional results than are obtained under present methods, and that the other advantages claimed for it are real and not imaginary. In regard to the first claim, that it greatly lessens the stay in the hospital, an examination of records of the Massachusetts General Hospital proves conclusively that this statement is correct. The author says in examining literature he is unable to discover any advantage in the results of the ambulatory treatment over the present modern treatment of fractures of the leg. He thinks that the present treatment is entirely satisfactory in most fractures, but he does not think that it is satisfactory in fractures of the femur. In fractures of the femur he uses Taylor's hip-splint, assisted by coaptation or plaster-of-Paris splints. The ambulatory treatment of fractures does not perfectly immobilize, and therefore cannot pre-eminently succeed; but in certain carefully selected cases of fracture below the knee, particularly of the fibula, it is possible to conceive of the ambulatory method being used without doing harm. The method in general seems unsurgical; the plaster splint may produce pressure-sores and its employment may be followed by embolism of fat and blood. The injured limb ought to be at rest while the reparative process is commencing, and muscular relaxation is desirable in the treatment of fractures.

Championnière¹ advocates the treatment of fractures by **massage and mobilization**. He not only does not consider immobilizing a fracture as essential, but he considers it harmful. He says that a fracture when mobilized and treated with massage will unite more quickly than if it is immobilized. He says that most fractures of the humerus, all fractures from the finger to the elbow, and fractures above the insertion of the deltoid can be treated by this method, and the method is particularly valuable in aged individuals. He holds that no injured organ or tissue repairs better when it is immobilized, and that movement is absolutely essential to their repair, and states that immobilization in the treatment of surgical injuries should become a thing of the past. [We fancy that the profession at large will not agree with these sweeping conclusions. We certainly do not.]

William H. Bennett² writes upon massage in the treatment of recent fractures. He states that the treatment has not received the attention in Great Britain that it deserves. It has not met with favor because of the tradition that complete rest and immobility are necessary, and the fact has been overlooked that massage does not necessarily mean material movement between the fractured ends, although the muscles about them may move freely. Massage, if properly used, need not produce any movement between the ends of the bones, and in the most difficult cases the amount of movement of the fragments is not sufficient to delay union. Union occurs more rapidly in cases treated by massage than in those treated by ordinary plans. Bennett says it is proper to raise the question whether slight movement between the fragments, if the position of the part is good, is not actually conducive to union, for we must remember the fact that in many cases of fracture in which union is slow consolidation rapidly takes place when some mobility between the bone-ends is brought about, either by making passive motions or

¹ Le Scalpel, Jan. 2, 1898.

² Lancet, Feb. 5, 1898.

encouraging the patient to use the limb. The most troublesome part of the management of many cases of fracture, especially fracture of the lower part of the leg, consists in the stiffness, the pain, and the difficulty of movement which are complained of when the splints are removed. These conditions, as a rule, can be overcome by exercise, massage, or forcible movement under an anæsthetic; but not rarely the tendons and soft parts become glued together and produce permanent crippling. Prolonged retention of the limb in splints tends to produce this matting process and increases the number of bad results that follow fractures. The pain and stiffness which exist are often believed to be due to adhesions in or about the joint, or to some slight faulty position of the fractured bone; but really the conditions result from matting together of the soft parts about the line of fracture. If a recent case of fracture is treated by massage, matting of the soft parts becomes impossible. The tendons are prevented from adhering, the muscles will not waste, the joints are kept supple, and the nerves will not be tied up in adhesions, and when the patient begins to use the limb the movements are as free as if no fracture had taken place. The muscles are strong and neuralgic pain is absent. There are other reasons for the adoption of this plan of treatment. In many cases treated by ordinary methods there is most distressing muscular spasm, and in some cases this is practically uncontrollable by ordinary plans of treatment. Massage, however, will control this spasm. In fact, a patient who is suffering from spasm may fall asleep while massage is being applied. Bony union is hastened because of improved circulation in the part. The technic is as follows: Gentle rubbing in the upward direction over the fracture to soothe the patient, relieve muscular spasm, and promote the absorption of extravasated blood. Make passive motions of the joints above and below the fracture, and thus prevent matting of the soft parts. Apply to the muscles ordinary massage-processes. In order to render the method clear, Bennett describes its application in a case of fracture of both bones of the leg, 3 or 4 in. above the ankle-joint, in which there is no difficulty in keeping the bones in good position. The fragments are reduced, the limb is placed upon a posterior splint reaching above the knee, and the foot is fixed to a foot-piece. No more bandage is applied than is absolutely necessary, as much as possible of the area of fracture being left exposed. Gentle smoothing-movements are now made up over the ankle with the flat of the hand. These alone produce pain. Ten minutes of this rubbing is enough at the first application. If at the end of this time the parts are fairly comfortable, the toes are taken altogether between the surgeon's thumb and fingers and gently extended upon the metatarsal bones several times. At the end of the sitting side-splints or sand-bags are used in addition to the posterior splint, in order more certainly to steady the fracture. This proceeding is repeated daily for from 4 to 7 days, the time of each *séance* being gradually increased to 20 minutes and the side-splints being removed before each rubbing and replaced after its termination. At the end of this time, if the fracture is in good condition and there is no sign of displacement of the fragments, the bandages are removed from the foot and ankle, leaving the limb exposed and lying on the splint. The smooth rubbing is applied over the foot, ankle, and leg for about 10 minutes, and then without removing the limb from the splint the surgeon flexes the ankle 2 or 3 times on the leg whilst he steadies the fracture with his hand. The bandages are then replaced. This maneuver is repeated daily for 3 or 4 days, after which the limb at each sitting is lifted off the splint on to a flat pillow, the rubbing is more thoroughly done, and the movements of the ankle more freely made, the fracture, of course, being supported with 1 hand, and at the

end of each sitting passive motions of the knee are made. At the end of 1 week the union is usually firm enough to permit of all the manipulations of ordinary massage, and the patient is encouraged to move the ankle spontaneously, the fracture being fixed with some sort of short splint. Complete massage is continued daily until there is fair consolidation, this requiring in most cases about a month. During the first fortnight of the treatment the patient should be confined to bed. After that he may lie on a sofa and go about on crutches. If this is done, a moulded poroplastic or leather splint can be worn, the splint being fixed so that it can be easily removed. If the fracture is near to or in a joint, the treatment is more difficult and requires great care. In Pott's fracture the ankle must be uncovered from the commencement of the application of the rubbing and the passive movement. Under this method of treatment a patient obtains great comfort from the fact that he is frequently released from the restraint imposed by splints. It is quite true that when we treat a man by this method he must be retained in the hospital longer than if we placed the extremity upon an immovable splint; but the advantages outweigh the disadvantages. The difficulties connected with the application of this treatment interfere with its general adoption. The chief difficulties are two: first, the large amount of time which the practitioner must give to the case in its early stages, and, second, the difficulty of always finding a person capable of conducting the manipulations in the later stages. [It is well to bear in mind the report of Begouin Anderodias on fractures of the patella treated by massage and early movements (method of Tilanus). Out of 30 patients treated by this method, 7 refractured the bone *through the callus*. The article will be found in the *Gaz. méd. de Paris* of Oct. 23, 1897.]

John B. Roberts¹ reported a case of **fracture of the lower end of the radius** in a boy of 12. The deformity consisted of anterior displacement of the carpal fragment.

Eugene R. Corson² reports a case of **Colles's fracture** treated prone on a flat splint, with chief regard to ruptured ligaments. On a previous occasion he pointed out that in a severe case of Colles's fracture, besides the fracture of the lower end of the radius, the styloid process of the radius is broken, and also the styloid process of the ulna, and that the two radioulnar ligaments and the internal lateral ligament are ruptured. The hand falls to the radial side because of the rupture of the internal lateral ligament. Since setting forth these views he has treated a very severe case of Colles's fracture based upon these ideas, and he has decided that the treatment is right in principle. The treatment is to lay the wrist and forearm prone and in a straight line with each other upon a flat splint, which is lightly padded and extends from just below the elbow to the metacarpophalangeal articulation. When such a splint is applied the fingers can be moved freely. In order to overcome the displacement of the ulna toward the palmar surface he made a wedge of a narrow roller-bandage, which was long enough to pass over the pisiform bone, and thus bridge the ulnocarpal joint. He does not use a pad over the radial fracture, as there is no tendency to displacement. He takes a bandage 1½ in. wide, begins on the ulnar side over the pad, carries it under the splint to the radial side and over the back of the wrist to the point of starting, making 2 turns; then over the radial side of the back of the hand to the metacarpophalangeal joint of the little finger, under the palm to the corresponding joint of the index-finger, and across the dorsum of the hand to the point of starting. This figure-of-8 is repeated several times, and the bandage is then carried up the

¹ Phila. Med. Jour., Apr. 16, 1898.

² Med. Rec., Jan. 15, 1898.

forearm. When the hand is thus placed, a straight line drawn through the middle of the index-finger will touch the outer margin of the radial styloid. At the end of 3 weeks he took a radiograph and made outline-tracings. He believes that the best way to reach conclusions by using the X-rays is to trace the outlines on paper from the negative by strong transmitted light. The tracing shows the transverse fracture of the radius and a fracture of its styloid, both the fragments being in good position, and it shows the pieces broken off from the styloid of the ulna. The bandage was worn for about 6 weeks, the parts being massaged about 6 times a day. This period of retention is necessary to repair the ruptured ligaments. After this time the movements of the wrist were found to be fair, and there was slight thickening at the point of fracture. He thinks that it will require several months to restore the parts to natural movements.

Carl Beck¹ writes on Colles's fracture and the Röntgen rays. He tells us that the rays soon made evident that there are a variety of different types of this fracture, and the author has never seen a case in which a diagnosis was made before the rays were used in which the diagnosis was not modified after the employment of the rays. He has had skiagraphs taken of 44 cases of Colles's fracture. In 19 a distinct transverse fissure was noted above the capitulum ulnæ; in 7 cases the ulnar styloid was broken off. In some cases, besides the transverse fracture, there was also a vertical fracture of the radius passing into the joint. In 14 cases there was no displacement, the dorsal periosteum having kept the fragments together. These facts showed that the same plan of treatment may not be applicable to all cases. A different plan ought to be used, if there be complete separation of the lower end of the radius, from that which is applied if there is only a fissure. It is important to know the direction of the line of fracture, and whether it enters the joint, and whether there is any impaction. If there is impaction, unless thorough reduction is effected, the functions of the wrist will not be restored. The method of reduction and treatment will be modified when there is a fracture of the ulna or its styloid process, or when a particle of bone has been chipped off. If there is displacement, accurate reduction must be effected. If forced extension and downward pressure by the surgeon's thumb are made while counterextension is made on the forearm flexed rectangularly, reduction will usually be readily effected; but if it is not, an anæsthetic must be administered. The fragments can be kept in place by applying an adaptable wire splint on the flexor side of the forearm from the tip of the fingers to the elbow, the splint being applied while forced traction is made. If the displacement is upward, a pad of adhesive plaster is applied to the dorsal integument above the fragment and a narrow piece of wood is placed on the dorsal surface of the arm, reaching from the metacarpophalangeal joint to 4 in. above the wrist, the splint being held in place by a gauze bandage. If the displacement is downward, the wooden pad is put on the flexor surface and a wire splint is applied. If the displacement is sideways, the adhesive plaster pad is put on the side of the fragment, 2 long wooden splints being also used. One of these splints is a little broader than the diameter of the bone, and it begins at the metacarpophalangeal joint of the thumb; the other begins at the same joint of the little finger, and both reach the elbow. After applying the dressing, take a skiagraph to verify the position of the fragments. Beck says that Nélaton was right when he declared that the strong ligamentum carpi volare never breaks, and that it is the bone we must look out for. If after a week the fragments are agglutinated and there is no obvious deformity, the soft tissues must then

¹ Med. News, Feb. 19, 1898.

be considered, and it is only then that short splints can be used. These consist of padded bits of wood, extending from the carpophalangeal joint to the middle of the forearm. After 1 week has passed they extend only to the wrist, and the patient is told to move his fingers as if playing the piano. After the third week massage is employed, and also active and passive motions of the joints.

Charles H. Frazier¹ has reported a series of **fractures of the elbow treated by the Jones's method**, and he thinks that this method is most excellent for injuries in and about the elbow-joint. He does not apply it with adhesive plaster, as has been done by others, but uses a dressing which is shown in Fig. 40. It consists of an armless jacket, lacing up one side, with a mitt attached to the sound shoulder. In



FIG. 40.—Frazier's modification of Jones's dressing for injuries of the elbow-joint (Frazier, in Univ. Med. Mag.).

the case reported passive motion was begun, as a rule, on the seventeenth day. He states that when the fragments are properly reduced they cannot be easily displaced if the extremity is kept in Jones's position. This position prevents the formation of excess of callus, which hampers the movement of the joints. The fragments are so well fixed that excessive callus-formation is prevented. If the reduction has been perfect, there is little danger of a "gunstock" deformity. Dispensing with splints and bandages avoids any interference with the circulation of the limb, allows of daily inspection, and permits of the early employment of massage without removing the dressings, and this early employment of massage hastens absorption of inflammatory exudates and prevents muscular atrophy. The position of acute flexion is far more comfortable than is the position of forced extension. Should partial ankylosis result, as it some-

times will, despite close attention to detail, an arc of motion ranging from complete flexion to incomplete extension is a much more useful one than that from complete extension to partial flexion.

Charles B. Ball² describes the treatment of **fracture of the patella** by fixation with a tire of steel-wire rope. He says that there are 2 classes of cases in which operation should be considered: first, as primary treatment shortly after the injury, and, second, when there is imperfect union or nonunion and the patient is seriously crippled. In the case of a compound fracture everyone agrees that, if it is possible to save the limb, the joint should be cleansed and the fragments sutured. But in the case of an ordinary simple fracture the road is not so clear. Many of these cases will recover with a useful limb by ordinary methods of treatment; and if ordinary methods fail, a secondary operation can be undertaken with every prospect of success. Many surgeons reserve primary suture for compound fractures. There are, however, distinct advantages in immediate operation. It enables the patient to go about in 2 or 3 weeks, and prevents to a great extent intraarticular adhesions, and if proper permanent sutures have been applied, refracture of the bone, which is common after ordi-

¹ Univ. Med. Mag., Apr., 1898.

² Practitioner, May, 1898.

nary treatment, will be almost impossible. In opening so large a joint as the knee there is a risk of sepsis, unless the technic is perfect; and if the surgeon has not every facility for carrying out such an operation, he had better treat a fracture of the patella by the old method, and if a useful limb is not obtained in this way, at a later period an operation can be undertaken. Ball is convinced that the open method is the right one. Even in primary operations the advantages are obvious. The open method enables us, even in primary operations, to adjust the fragments with nicety and cleanse the joint of blood-clot and effusion. Of course, we could get rid of fluids by aspiration, but blood-clots remain unless the joints are opened freely, and blood-clots are an excellent culture-material for bacteria. The complete evacuation by free incision more than compensates for the wound. In the secondary operation free incision is, of course, imperative. The incision which is usually made is a vertical one over the center of the patella; but Ball prefers to raise a horseshoe-flap in front of the joint. This flap gives increased room, and when it is replaced the line of union of the bone with the encircling suture is covered up. He uses for suturing a rope made of 8 strands of fine steel wire closely twisted together. It is very strong, it does not kink, it is pliable, easy to adjust, and thoroughly aseptic. A separate piece of rope is passed around the upper and lower fragments, and these are twisted together at each side of the bone. This is a better method than to encircle the patella with a single piece and twist the ends at one side only, because we can more readily obtain a proper degree of tension and a more perfect adjustment. Figs. 41 and 42 exhibit the method of operating.

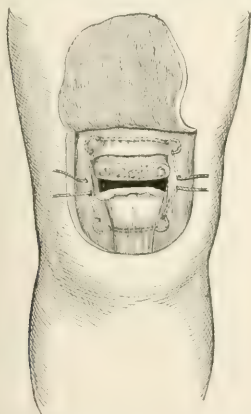


FIG. 41.—Tying of a fracture of the patella with steel-wire rope. Method of applying the wire after raising periosteal flaps and vivifying the fractured surfaces (Ball, in *The Practitioner*).

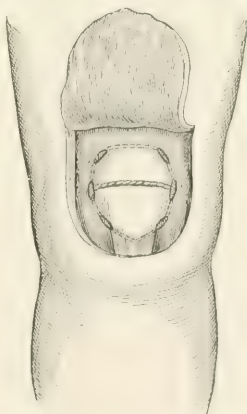


FIG. 42.—The broken fragments brought into apposition and the tire tightened: the ends of the rope are twisted at each side and hammered smooth; the loops of wire are countersunk into the tissues by means of small incisions, and the periosteal flaps closed across the line of fracture by fine catgut suture (Ball, in *The Practitioner*).

Peyton T. B. Beale¹ inquires, When should a transverse fracture of the patella be treated by wiring? There is one point worthy of consideration. Is

¹ Treatment, Jan. 27, 1898.

the knee-joint a perfectly healthy joint after fracture of the patella has taken place? The fracture must lead to an effusion of blood into the joint. The blood is a foreign body and will bring about inflammation of the synovial membrane. This condition may begin as early as 5 minutes or as late as 10 to 12 hours after the fracture, and tissue which is subjected to inflammation is less able to resist pyogenic organisms than is normal tissue. If we open the joint during a slackening of the rate of blood-flow or stasis and exudation, any septic organisms which happen to fall upon the synovial membrane will probably grow and multiply; but if we open the joint while active hyperemia exists, organisms may be washed away and destroyed, or they may be carried to an adjacent part, where they may flourish and so infect the whole synovial membrane. If the knee-joint with effused blood in it be kept at rest on a nearly straight splint and under the influence of cold, inflammation will subside as the blood is absorbed. The synovial membrane will again become healthy. It may do so even if some blood is unabsorbed, the membrane becoming tolerant, and the joint may then be opened with no more risk than that which attends the opening of a normal joint. In some cases in which an unfortunate result has followed wiring of the patella, it has been the result of infection with organisms at a time when the stage of inflammation was still present. Operation should be performed immediately after the fracture, when blood has not begun to be effused and no direct violence has been applied to the part. In the great majority of cases the operation should not be performed until some time after the fracture has occurred. Theoretically, septic organisms should never enter a wound; but practically this cannot always be ensured. The next points in considering the suitability of doing an operation are the occupation and age of the patient. If a man of 65 has a transverse fracture of the patella, and his occupation necessitated the free use of the lower limbs, it should be wired. The occupation is more worthy of consideration than the age. If the occupation does not require such activity, the patient should not be advised to have his patella wired, but should be allowed to decide for himself.

Arthur E. Barker¹ makes a suggestion for the **open method of suture of old fractures of the patella**. He thinks that the usual methods of incision are objectionable. The incision should enable us to gain free access with a minimum amount of cutting, and the resulting scar should be out of reach of pressure either from kneeling or from the knot of the wire; and a good, firm pad of tissue should overlie the front of the patella and the wire sutures. The steps of the operation are as follows: The lower border of the upper fragment is outlined by palpation as it is drawn down as far as possible. The curved incision is made with its convexity upward, beginning just below the level of the fractured surface of the lower fragment and curving upward and crossing the middle of the upper fragment to end at a corresponding point on the opposite side of the joint. This flap is dissected downward to the broken surface of the upper fragment and the knife is carried across the face of the fragment, clearing it from all fibrous tissue until the joint is open. The edge of the knife is then turned forward and placed on the posterior border of the broken surface of the lower fragment, and the fibrous tissue is cleared away in a similar manner. The fibrous tissue is thus removed from between the fragments, but is left attached to the deep surface of the middle of the flap, and the remains of the patellar bursa are left undisturbed. A sponge is pushed under the bones to protect the joint and the bones are freshened with a saw or chisel. The silver suture is passed by a stout-handled needle with an eye near

¹ Lancet, Apr. 2, 1898.

the point. It is pushed through the skin immediately under the lower border of the distal fragment; it is then passed through the ligamentum patellæ, scraping the border of the fragment in the middle line and passing behind both fragments. When the needle reaches the upper border of the upper fragment it pierces the muscle in the middle of the fragment, and it is then threaded with a wire and withdrawn. When the point of the needle has cleared the lower edge of the lower fragment in withdrawal, it is thrust in front of the lower fragment under the flap and is unthreaded in the original wound. Each end of the wire is threaded on a steel bar, and, with these bars as handles, a strong pull is made upon the fragments and the wire is twisted. It is cut off and the end is flattened down. Of course, clots have previously been removed on a sponge. The flap is now laid in place and sutured without drainage, unless there is decided oozing, when at each angle a stitch may be left out. A soft elastic dressing is applied and left without bandage. No splinting is required, and the patient is urged to move the leg from the first. Massage is daily employed around the joint. The stitches are removed on the tenth day. [Treatment of fracture of the patella without operation is by no means satisfactory. A fracture so treated requires about 2 months to unite with moderate firmness, and for 4 or 5 months more the limb must be kept extended because of the danger of stretching apart of the line of union. In many cases so treated the patient is crippled for life. The open operation enables the surgeon to remove blood and aponeurotic fibers from between the fragments and blood from within the joint, to approximate the fragments perfectly, to maintain secure apposition, and to obtain rapid bony union. In some cases, however, infection has occurred, followed by joint-ankylosis or by death. Such occurrences, though rare, have prevented the acceptance of operation as a routine procedure. If a surgeon is sure of his capacity to operate aseptically, and if the surroundings and condition of the patient do not contraindicate it, wiring may be done. Barker's operation of subcutaneous wiring gives satisfaction in recent transverse fractures.]

Mr. Arbuthnot Lane¹ operated on a case of **fracture of the neck of the femur** at the upper epiphysis in a boy of 14. The fracture had been inflicted several months before. On admission into Guy's Hospital there were shortening and outward rotation. Flexion of the hip took place around an axis which ran from behind forward and inward, forming a much larger angle than normal with a vertical transverse splint. The shortening could be readily compensated for, and there was no marked striking of the stump of the neck against the spine of the ilium in flexion. The chief disability was the alteration in the axis of rotation and flexion, and when the hip-joints were flexed the knee became widely separated from its fellow. It was evident to Lane that this outward rotation depended on the shortening of the spaces between the points of attachment of the iliofemoral ligament, and that outward rotation was limited purely by the resistance offered by this ligament. He maintains that the axis of rotation around which the fractured femur moves in flexion of the hip-joint could be restored to the normal by approximating sufficiently the points of attachment of this ligament. He therefore exposed the capsule of the joint and inserted loops of strong silver wire parallel with the ligament in such a manner that traction on the wire shortened the ligament and approximated its points of attachment. The traction was made until the outer aspect of the great trochanter looked outward, instead of almost directly backward. The wire was secured and the wound closed. This operation was productive of very great benefit to the patient.

¹ Practitioner, May, 1898.

Theodore Dunham¹ describes a method of treating **fracture of the femur in infants** and children. The skin is cleansed and dusted with bis-muth powder, the thigh is semiflexed, and a flannel bandage applied as a spica is put upon the upper part of the thigh and pelvis. Over this a spica of plaster is applied. A flannel bandage is carried from the roots of the toes to the spine of the tibia and overlaid with plaster. Two pieces of suitably bent iron are now taken, one end of the iron being attached to a plaster spica over the groin and the other end to the front of the plaster over the leg. At the points where the iron is to lie thick plaster is placed, and the iron is sunk into this plaster and bound by several turns of plaster bandage. While attaching the irons the limbs should be held so that the thigh is straight without rotation, and the hip and knee semiflexed. The iron should overlap accurately at the front of the thigh. When the plaster has set let one assistant make extension on the leg, while another makes counter-extension by pressing the pelvic spine firmly upon the table. This traction will reduce any shortening and the irons will glide one upon the other, and while this tension is maintained the 2 irons are lashed together with stout twine.

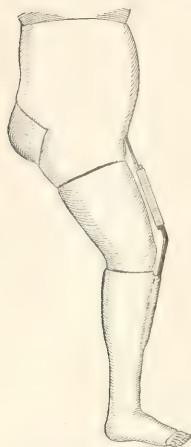


FIG. 42.—Dunham's apparatus for treating fractures of the thigh in infants and children (Dunham, in Phila. Med. Jour.).

Robert H. Dawbarn² writes an article in which he sets forth practical points upon **fracture of the thigh-bone**, especially in babies. He states that this fracture is comparatively frequent in children. Formerly diastasis was thought to be the lesion, and yet both injuries are very rare as compared with fracture of the shaft. Until about a year after birth there is no bony epiphysis with the line of cartilage joining an osseous head with an osseous neck, for up to that time the entire upper extremity of the femur is cartilaginous. Separation of the lower epiphysis from the shaft is much commoner than is separation of the upper epiphysis. Diastasis of the lower end may result in 9 in. of ultimate shortening in a child; whereas similar injury at the upper end can occasion only half of this amount of final shortening. Dawbarn does not think it necessary in treatment to discriminate between intra- and extracapsular fractures. The treatment in both these varieties should be identical. He then discusses the symptoms of fracture of the neck of the thigh. He tells us that all possible varieties of thigh-splinting resolve themselves into four heads: 1, immobilization; 2, immobilization and a horizontal traction; 3, immobilization with elevation; and, 4, immobilization with elevation and traction. Immobilization is, of course, used in every case, the other elements being employed or not according to whether the fracture is oblique or transverse. If a patient has a fracture in the lower two-thirds of the shaft and from direct violence, the fracture is usually transverse and there is little tendency to displacement, and in such a case immobilization alone is sufficient; but if a fracture occurs in the same region from indirect violence, there will be an oblique line of fracture, and unless steady traction is kept up the ends will slip past each other. Here No. 2 is a desirable method of treatment. When Buck's extension is employed we should, even for a child, employ a doubled thickness of the adhesive strips; otherwise it may steadily give way. The rough esti-

¹ Phila. Med. Jour., Apr. 23, 1898.

² Ann. of Surg., Oct., 1897.

mate as to the weight to be attached is 1 pound for each year up to 20. Method No. 2 can also be applied to shortening from fracture of the neck of the bone. We should remember that much more often in the child than in the adult the line of fracture is transverse, and even more frequent than transverse fractures are greenstick or partial fractures. Suppose a fracture of the shaft high up from direct violence, the line of fracture being transverse; in such a case No. 3 is the best form of treatment, for it will satisfactorily antagonize the forward tilting of the upper fragment. This can be accomplished by the anterior splint of Nathan R. Smith or by double inclined planes. The flexed position is best in fractures very low in the shaft, where the gastrocnemius tends to flex the lower fragment upon the tibia. One way of trying plan No. 3 is to flex the baby's thigh against the abdomen and to retain it there by bandages or pasteboard splints, or adhesive strips. This plan is satisfactory if shortening be absent or insignificant in amount in fracture, either of neck or shaft, in infants; if the break is high in the shaft or in the neck it is especially useful. Van Arsdale's method with a pasteboard triangle is very effective, and comes under this head. Suppose we have to deal with a break high in the shaft and oblique in direction. Here we are threatened with angular deformity and shortening. Nathan R. Smith's plan overcomes angular deformity, but not shortening. Here we need method No. 4, which is personified by Hodgen's splint. Under this plan, too, belongs the plan of Schede, of Hamburg, which is used for infants only. This is the method of vertical suspension. The feet are wrapped in cotton and strapped together, and by a tackle may be lifted until the buttocks rest lightly on the bed. A coaptation-splint is used in addition; or one of plaster of Paris in fracture through the shaft. If this position is used in a female child the vagina must be syringed daily with a warm solution of boric acid, otherwise the accumulation of urine will give rise to inflammation. Dawbarn then discusses the technic of applying plaster to children.

George S. Brown¹ calls the attention of the profession to the use of the old, but much neglected, **Hodgen's splint** for fractures of the thigh. He thinks it is less troublesome and more comfortable and effective than Buck's apparatus and plaster-of-Paris dressings. He believes the reason for the general abandonment of the method is that a written description of the appliance conveys a very poor idea of its principle. The constantly acting extension reduces shortening to almost nothing. Union is facilitated by the exercise which the patient and the limb get. The patient is far more comfortable. This splint is usually classed along with Smith's splint; but Smith's splint does not give a useful amount of extension, while the Hodgen splint gives a more useful amount than does any other appliance. The author then describes carefully the proper method of applying Hodgen's splint.

Edgar Wilkinson and Eldon Harvey,² of Hamilton, Bermuda, report a case of fracture of the femur near the hip-joint during delivery. When the leg and thigh were in extension the fragments could not be brought in apposition. Following the directions of Wyeth, they placed the leg so that it was flexed on the thigh, and flexed the thigh on the body; the parts were enveloped with a flannel bandage and plaster-of-Paris rollers from the axilla to the pelvis, and around the broken thigh and leg as far as the ankle. The dressing was removed at the end of 4 weeks, when union was found to be perfect.

A. Ernest Gallant³ describes the use of **Van Arsdale's triangular splint** in fractures of the shaft of the femur in infants and children under 6

¹ N. Y. Med. Jour., Aug. 7, 1897.

² N. Y. Polyclinic, Nov. 15, 1897.

³ Jour. Am. Med. Assoc., Dec. 18, 1897.

years of age. He reports 33 cases in which this was used, and gives a statistical table of 64,000 fractures, showing the percentage of fracture of the femur at various ages. Van Arsdale's splint is made of thick straw or binders'

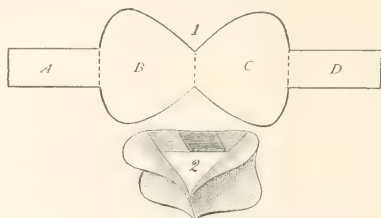


FIG. 44.—1, Diagram showing outline of splint, to be folded on the dotted lines; each section to equal the length of the child's thigh. 2, Diagram, splint folded, fastened by rubber plaster, flanges bent to embrace the thigh and abdomen, ready for adjustment (Gallant, in Jour. Am. Med. Assoc.).

board. In order to adjust it, first measure the length of the sound thigh from the middle of the groin to the end of the femur. Draw upon cardboard a figure like a double playing-card spade (Fig. 44), the spades united at their points,



FIG. 45.—Showing Van Arsdale's triangular splint in position. Note the wide space between the dressings and the excretory passages (Gallant, in Jour. Am. Med. Assoc.).

each of the four sections (*A, B, C, D*) being equal to the length of the child's thigh, the flanged portions being equal to the widest part of the thigh. The outline-figure is then cut out. The cardboard is moistened on one side and folded on the dotted lines, lapping section *A* over *D* so as to form a triangle. It is fastened together by adhesive plaster. The thigh is flexed, and the triangle is placed so that one flanged portion embraces the thigh and the other lies upon the abdomen. The splint is secured by muslin bandages carried through the splint, around the body, and then around the thigh. Lateral motion is prevented by taking figure-of-8 turns at the upper angle around the body and at the lower angle around the knee. The splint is then fixed with starch or crinoline bandages. If the child has a very prominent abdomen, the upper border made by overlapping *A* and *D* can be shortened so as to increase the flexion of the thigh and throw the body-weight farther forward, allowing the child to sit down with greater ease and comfort. The leg should be bandaged from the toes up to the knee, to prevent swelling, but not so as to prevent flexion at the knee. At the end of the week the splint is examined and, if necessary, replaced, and at or about the end of the third week it is removed. Firm consolidation was obtained in all cases. By the use of this splint the author holds that overlapping is prevented by the flexed position of the thigh relaxing the muscles. The fragments are held in nice apposition and are thoroughly immobilized. The dressing is not soiled by the excretions and readjustment is not frequently called for. It is not necessary to confine the patient to bed, and hence com-

plications due to confinement in bed are avoided. The child can nurse at the breast, sit on a chair, play on the floor, even learn to crawl about, and sleep on either side. Nonunion rarely, if ever, occurs. For older children and adults the triangle can be strengthened by the use of plaster of Paris.

James P. Warbasse¹ writes a careful article upon the treatment of **fractures of the lower extremity**, and makes a clinical report on 450 cases, describing in detail the application of the method of treatment which is desirable in each form of fracture.

Clayton Parkhill² presents some further observations regarding the use of the **bone-clamp in ununited fractures**, in recent fractures with a tendency to displacement, and in fractures with malunion. The instrument shown in Fig. 46 is adapted for use in all parts of the femur except the neck; the in-

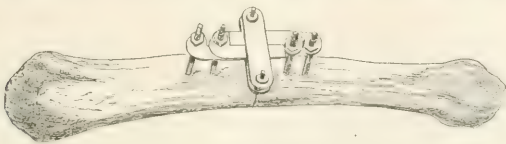


FIG. 46.—Top view of clamp on tibia (Parkhill, in *Ann. of Surg.*).

intermediate size is adapted for the tibia, humerus, and patella; the smallest size, for the bones of the forearm, fibula, and clavicle. The instrument is easily adjusted and thoroughly immobilizes the fragments, permitting neither lateral nor longitudinal motion. It is made of steel, heavily plated with silver, in order to secure the antiseptic influence of silver. It consists of 4 shafts, each with a thread cut on the lower end and also one on the upper end. The extreme upper end is made square, so that the shaft may be governed by a clock-key. Two sets of curved wing-plates are attached to these shafts, the long bar corresponding to the outer ones and the shorter pair to the inner. Each wing-plate is fixed to its shaft by 2 nuts running upon the upper thread, one above the plate and the other below, for accuracy of adjustment. When in position one wing-plate overlies the other in each half of the instrument, and when clamped the pair lie side by side. They are fastened together by a steel clamp with a screw in each end. These screws and shafts are controlled by the same clock-key, and the nuts by a wrench. Each fragment must be drilled, and a small steel pin is thrust in the first hole while the second is being drilled, in order that they may be made parallel. The distance between these holes is determined by the bone under operation and the size of the clamp. The drill should be a little bit smaller than the shaft of the instrument, in order that the thread may take a firm hold on the bone. The shafts are screwed in place by means of the clock-key. This is more rapidly accomplished by means of the clock-key attachment fitted to a Langenbeck brace. When the shafts are in place their corresponding wing-plates are adjusted and fixed by means of nuts. While the fragments are held in neat apposition the wing-plates are clamped together. The instrument projects through the incision in the soft tissues, and these tissues are sutured between the shafts and dressings are applied. If possible, the wound should be sutured without drainage, and the part is enclosed in a fixed dressing of plaster of Paris or something similar. The instrument should be removed in from 4 to 8 weeks, depending upon the bone operated upon and the conditions of the particular

¹ *Ann. of Surg.*, May, 1898.

² *Ibid.*

case. Parkhill gives the histories of the 4 cases upon which this apparatus has been used.

Newton M. Shaffer¹ discusses the mechanical treatment of **ununited fracture of the neck of the femur**. He describes a case of ununited fracture in which the surgeons had told the man that he must either be lame for life or have a surgical operation performed. The patient declined to submit to a surgical operation. Shaffer applied the long, straight Taylor splint about 12 weeks after the original injury. In about 4 days the legs were of equal length. A belt, about $3\frac{1}{2}$ in. wide, made of surcingle-material, such as is used by saddlers, was now passed around the pelvis, a crescentic horsehair-pad being placed over the trochanter major. The belt was firmly buckled at the opposite side of the pelvis. The limb was now placed in abduction at an angle of about 20 degrees, the origin of the abductor muscles being used as a fixed point to throw the distal toward the proximal fragment. A lever was thus created, the fulcrum being between the power and the resistance. The limb was placed on an inclined plane at an angle of about 135 degrees. Later the lateral pressure was increased by passing a tourniquet over the padded surcingle. Being somewhat worried about the condition of the knee-joint, Shaffer carefully measured the patient for an apparatus which combines all the advantages of the straight traction-splint, with an arrangement at the knee by which motion can be secured at this articulation whenever necessary. This patient was discharged cured. The author cites 2 other instructive cases to prove the value of this method.

DISEASES AND DISLOCATIONS OF THE JOINTS.

De Quervain² reviews the literature of **coxa vara**. He describes the following varieties: *a*, congenital (which is very rare). *b*, infantile (rickety); 1, simple bending of neck downward (Kocher's coxa vara); 2, bending of neck downward and backward. *c*, coxa vara of adolescents; 1, Kocher's coxa adductor; 2, bending of neck downward and backward with rotation of the head on the long axis; 3, mounting up of the trochanter with inward rotation of head. *d*, coxa vara of adults (but 1 reported case, and that was due to osteomalacia). Males suffer from coxa vara more frequently than do females. As a rule, the disorder is one-sided. The usual cause of infantile coxa vara is rickets. The common cause of coxa vara adolescentium is late rickets, though occasionally cretinism or osteomalacia may be responsible. The condition is predisposed to by an occupation which entails prolonged standing or frequent lifting of weights, by a traumatism, or by any inflammatory condition of the femoral neck. The disease comes on most insidiously; pain in the knee is complained of, the patient limps and finds much trouble in kneeling or in the act of sitting. Later in the case pain becomes less, but stiffness of the hip-joint becomes more noticeable. Examination shows that the region of the trochanter is prominent, there is a furrow between the trochanter and the glutei muscles, abduction is limited in extent, as a rule some adduction exists, and the muscles of the thigh are wasted. In cases in which, with bending of the neck, there are displacement backward and rotation of the head, the limb will be rotated externally and adducted, internal rotation cannot be accomplished, and flexion is often impossible. In all varieties of coxa vara the trochanter is above Nélaton's line. The prognosis depends upon the age. Before 5 years of age rickets is the cause, and the condition may disappear. Later than this it will not disappear. The diagnosis must be made from incipient coxalgia. In

¹ N. Y. Med. Jour., Oct. 23, 1897.

² Sem. méd., Jan. 29, 1898.

incipient coxalgia there may be some trivial amount of external rotation, but there are with this abduction and flexion. In coxa vara there is adduction without flexion. Besides coxalgia, coxa vara might be confused with dislocation forward of the femur, fracture of the neck (when pain becomes severe in coxa vara because of an injury), old fracture with deformity, epiphyseal separation, and congenital dislocation. The treatment of coxa vara is not very satisfactory. Any constitutional trouble, such as rickets, must be treated. Rest in bed with extension relieves pain and increases the range of movement, and in rickety conditions tends to straighten the neck. In old cases, in which walking is interfered with, osteotomy should be performed.

A case of **acute purulent pneumococcus-arthritis** is reported by Tournier and Courmont¹ as occurring in a man, aged 50, during an attack of pneumonia, the patient suffering also from syphilis in the secondary stage. Suppurative arthritis of the left knee developed suddenly on the sixth day of the pneumonia; arthrectomy was done, but other serous surfaces becoming involved, the patient died. They conclude from a study of this and other cases that arthritis due to infection from pneumococci varies widely. There may be (a) hydrarthrosis, (b) the ordinary purulent form, (c) a slight form with no appreciable lesion, and (d) a form in which the bones and cartilages of the joint are involved. The last variety occurs oftener than is suspected, and fatal results occur from the tendency of the inflammation to extend to the pleura, pericardium, and meninges. The pneumococci are always found in the pus from the affected joints, the other serous surfaces becoming infected through the blood-current.

E. G. Brackett² advises conservative treatment of **tuberculous joint-disease**, and reports 3 cases of hip-joint disease in children as a justification of his position. He claims that "the conservative method depends upon the cicatrization in the tuberculous process, which at some stage of the disease walls off the affected portion. It is known that if bone is placed under proper conditions it will heal, and for this it is necessary that the diseased part should be kept in a condition of physiologic rest, which would vary according to the locality of the disease." "The principle of the conservative treatment is the rigid enforcement of rest and protection from bruising of the two joint-surfaces. It must be borne in mind that the freedom, which to a normal joint is physiologic, becomes in a diseased one a source of actual trauma and constant irritation." The indications which are met in a diseased joint demand a continuance of the utmost care for a long time, and may be considered under the heads of immobilization, traction, and the removal of weight from the limb. Immobilization must be complete, and all involuntary motion is to be guarded against.

W. H. Brown³ reports his results in the treatment of tuberculous joints by the **injection of iodoform**. He reports 30 cases, the ages of the subjects varying from 2 to 45 years. He claims that several were apparently cured, and the disease arrested in the remainder, excepting 3 in which arthrectomy became necessary. The amount of iodoform used was 10 gr. at each injection, if the patient was under 8 years; 15 gr. if above 8 years, the number of injections varying from 20 to 30. Only cases showing well-marked signs were treated; 8 had suppurated. The joints after injection became slightly tender, and a rise of temperature lasting 3 or 4 days, with no gastric irritation, was noted. A week was allowed to pass between injections, with rest in bed and immobilization for joints such as knee, elbow, and hip, the

¹ Rev. de méd., Sept. 10, 1897.

² Boston M. and S. Jour., Jan. 27, 1898.

³ Quart. Med. Jour., Jan., 1898.

patient being kept at rest until constitutional disturbance passed off. Iodoform was found in the urine within 24 hours after the injection, but he states this did not cause any discomfort.

John O'Connor¹ advises **surgical treatment of acute rheumatic arthritis**, and reports cases, with details of treatment. His view of acute rheumatism is that it "is primarily a joint-affection, due to some morbid material conveyed by the blood; that this poison—be it germ, ptomain, or ferment—gains admission to the human body through the tonsil or one of the many doors open to such intruders; that the joint-invasion is promptly followed by a form of acute arthritis with general toxemia; and, furthermore, the infected joints serve as incubators." Complete cure with preservation of function of the joint was obtained in all his cases, and each case was severe in character. He says that the "incision must be large enough to admit the index-finger, for lymph-coagula fasten in the recesses of joints, and nothing short of digital shifting suffices to detach them. Irrigation should always be carried out." He uses mercury biniodid, 1 : 5000. Care must be taken to leave the joint-cavity dry; a long roll of gauze is packed in, and when it is withdrawn the remaining flocculi are removed. Drainage must be provided for when there is any effusion. He quotes Treves and Keen and White to show how frequently gonorrheal arthritis terminates in ankylosis or destruction of the joint.

In a paper read before the Section of Surgery of the Royal Academy of Medicine in Ireland,² R. F. Tobin discusses **osteotomy of the femur** for tuberculous disease of the hip in its early stages. The cases which he considers suitable for this operation are those in which there are no indications of disintegration of the joint or of septic abscess, or of the disease being situated in the acetabulum, and in which, with the patient lying on his back and lordosis guarded against, the thigh on the affected side makes an angle of more than 30 degrees with the bed. He then performs the following operation: With the patient lying on his sound side, the affected limb drawn well up in front of its fellow and supported at its upper third by a moist sand-bag of suitable size and shape, all concussion of the joint is avoided by depressing the knee. Through a free incision the femur is almost divided obliquely from the lower border of the great trochanter to the lesser trochanter with an osteotome, and the undivided part fractured. The patient is then turned on his back, and with the spine in contact with the table, by fully flexing the sound thigh, the affected one is brought down till the posterior surface of the knee is also in contact with the table. A straight rod is then carried from both anterior superior spines down the limb and fixed. If there has been adduction, some abduction is made. The wound is closed and dressed. He claims that this procedure puts the limb at rest, and that by section of the bone there occurs in the neighborhood of the point of section an alteration in nutrition, which has a salutary effect on any tuberculous inflammation existing there. Kirkpatrick, Stoker, Stokes and Macnamara teach that tuberculous bone tends to mend after being incised. Owen is opposed to this, claiming in the *Year-Book of Treatment* that either nonunion will occur or the shortening will be intensified. Tobin advises the wearing of a Thomas splint after the patient is up and about, and in his report of 6 cases shows excellent results.

Dums³ advises **puncture or incision for tense effusions** into the knee-joint. As soon as the fluid is evacuated a firm bandage is applied and the limb put in an extended position and immobilized. The bandage is removed at

¹ Ann. of Surg., Feb., 1898.

² Lancet, Apr. 9, 1898.

³ Centralbl. f. Chir., Sept. 18, 1897.

the expiration of a week, a few passive motions are made, and a starch bandage is applied, the patient being given crutches in a week more. Passive and active motion is gradually increased, and at the end of 6 or 8 weeks a complete cure may be expected. His objection to early massage is that the joint-capsule becomes so stretched by fluid that a return is probable.

From a study of 6 cases of **dislocation of the semilunar cartilage** of the knee, Barker¹ satisfied himself that if the internal meniscus, which was the one dislocated in all his cases, is completely dislocated, no manipulation or movement of the joint can restore it. The mechanism of the knee-joint is by no means clear; but what appears to take place is as follows: During flexion the point of contact between the femur and tibia appears to shift backward a little, which of itself would relieve the pressure on the anterior curve of the meniscus and push the posterior curve backward. But, in addition, it would incline the internal lateral ligament somewhat backward, and in this way drag the semilunar cartilage back through the attachment to the lateral ligament. Apparently, one at least of the functions of the posterior crucial ligament is to prevent the femur slipping too far backward, for this ligament is rendered tense during flexion. Barker's conclusion is that when a partial slipping has occurred more than once, or when there is a complete dislocation, an operation should be done, consisting of stitching the cartilage to the periosteum; but if the form of the cartilage is greatly altered it should be removed.

Rieder² states that **caries of the sacroiliac synchondrosis** rarely results in cure without operative interference. In his case of tuberculosis of this articulation he made an incision which entirely encircled the os innominatum, which was also affected. He made this extensive incision in order to open up all spaces which might contain pus. The subsequent treatment was by continuous bath, inducing rapid granulation and recovery, with no perceptible defect in gait. If it is necessary to open the pelvic cavity it should be done at a subsequent operation, using a chisel rather than a trephine. If the ischio-rectal fossa is involved, drainage is made through the pelvic floor. He advises that in trauma the sacroiliac articulation should be carefully examined, the pronounced atrophy of the lower extremity on the affected side being frequently a guide.

The conclusions of E. H. Nichols,³ in a consideration of the surgical aspect of the **pathology of tuberculosis of the bones and joints**, may be briefly summarized as follows: Tuberculosis of the joints is usually secondary to tuberculous disease in the epiphysis of an adjacent bone, and is caused by tubercle-bacilli. Injuries of moderate degree favor its production. If it affects bone, it begins in the epiphysis and is more extensive than is shown by gross examination. The tuberculous process extending to the soft parts, an abscess forms, which is different from infectious abscesses, because partial removal of a tuberculous abscess-wall does harm. Repair takes place by the formation of fibrous tissue, which may in joints produce fibrous or osseous ankylosis. Paraplegia in Pott's disease is caused by tuberculous peripachymeningitis, which rarely causes cord-degeneration.

Parker Syme⁴ writes upon the treatment of **bunion**. He advises proper shoes, pads, or splints in cases of slight degree; but a well-advanced case should be operated on. His rules are: Never operate during an acute inflammatory attack. Do not attack the bursa, except when suppurating. Do not make the incision through the bursa, because it will leave a scar and will pass through infected tissue. Do not use Esmarch's bandage. Suture the wound without

¹ Lancet, Sept. 18, 1897.

² Boston M. and S. Jour., Jan. 27, 1898.

³ Deutsch. med. Woch., Feb. 2, 1898.

⁴ N. Y. Med. Rec., Oct. 2, 1897.

drainage, and give careful after-treatment regarding shoes, or a relapse will follow. Make the incision on the dorsum of the toe, and after retracting the tendon of the extensor proprius pollicis outward chisel away the inner side of the head of the metatarsal bone. In severe cases, with marked adduction and lateral dislocation, remove the head of the metatarsal bone and the prominent inner side of that bone. Secure the toe with pads and fix with a plaster bandage for 2 weeks. Walking is begun in the third week. A great deal depends on the after-treatment. Most cases will be cured by removing the inner "condyle" of the great toe, resection of the bone being seldom necessary.

J. Ewing Mears,¹ in discussing the operative treatment in **occlusion of the jaws**, states that the affection occurs in 2 forms, the spasmodic or temporary and the chronic. The former usually occurs in connection with some condition which affects the motor filaments of the third division of the fifth nerve, such as difficult eruption of the third molar, tumors, necrosis, tonsillitis, and operations on the lower jaw. The treatment for this form is removal of the cause. Permanent jaw-closure may be due to conditions which attack the alveolar processes or to conditions involving the temporomaxillary joint. Inflammation may lead to the formation of an osseous or cicatricial band. Pytalism may produce this condition; so may local injury or arthritic inflammation. Mears's conclusions are that jaw-closure due to the presence of cicatricial tissue in the buccal spaces can be most efficiently relieved by the formation of a canal lined with normal membrane. Reunion will not occur after division when this canal has formed. Synostosis of the temporomaxillary articulation producing jaw-closure can be best relieved by removal of both coronoid and condyloid processes, with the upper portion of the ramus, forming a false joint. This operation can be performed through the mouth.

A. T. Cabot² reports 7 cases of **ankylosis of the temporomaxillary articulation**, and discusses its surgical treatment. He calls attention to the better results accomplished now than in preantiseptic days. Bottini, in 1872, was the first to advise and carry out division of the neck of the jaw close to the articulation. In cicatricial contraction due to noma, burns, or lupoid inflammation the section of the bone must be in front of the cicatrix, forming a false joint in front of the detaining bands, Eschmarch's operation producing the best mechanical condition possible. In bony ankylosis the nearer the section is made to the joint the nearer do the conditions simulate the normal. The principal danger is asphyxia under anesthesia. The internal maxillary artery has been wounded, but this could have been prevented if a subperiosteal section had been made. Cabot follows Bottini's method, making an incision along the lower edge of the zygoma, with a vertical cut added if more room is needed, care being taken not to cut the facial nerve. A wedge-shaped piece of bone is cut with a chisel across the whole width of the neck of the jaw, even when including the condyle and coronoid process. This division is kept within the periosteum, and he states that he has never cut the internal maxillary artery. When the bone is divided a gag is put in between the cleft bone, the edges are rounded, and a cork kept between them for a week or 10 days.

W. Arbuthnot Lane³ reports 2 cases of **hip-joint disease**, and the treatment he adopts in these cases eventuated in the formation of a secure, freely movable joint between the upper end of the femur and ilium, immediately beneath the anterior inferior spinous process. He accomplishes this by fixing the head of the femur securely in position with heavy silver wire while the

¹ Jour. Am. Med. Assoc., Sept. 18, 1897.

² Lancet, Aug. 7, 1897.

³ Practitioner, Dec., 1897.

new joint is forming. The facility with which a new joint forms is inversely to the age of the patient. It is important that operation should be done as early as possible. The technic is as follows: An incision from the anterior inferior spine is made along the great trochanter down to the innominate bone. By dividing the muscles attached to the upper third of the femur the head of the femur can be brought into relationship with the anterior inferior spine, where a cavity has been cut with a burr. The end of the femur is then trimmed with a cutter, so that it will accurately fit the concavity made by the burr. A hole is then drilled through the femur, passing through trochanter neck and head, if a head exist, and finally the floor of the concavity of the ilium. The bones are wired with silver wire, which is first heated to redness and allowed to cool. The cut glutei are sutured with silk and iodoform-gauze is packed in the wound. In a week movement of the femur on the ilium is begun and continued daily. The wire is removed in 5 weeks, when movements of rotation of the femur on its long axis are begun. This procedure produced excellent results in Lane's case, and the opposite hip was operated on 6 weeks later.

Frazier¹ reports the results of a series of experiments of the **hot-air treatment** from both a clinical and a physiologic standpoint. His conclusions are that in joint-affections of traumatic origin hot air is a useful remedy, and he also recommends it in the treatment of sequele of any joint-injuries which have proved intractable to other remedies. It should be used as an auxiliary to massage, passive motion, etc. In rheumatic trouble temporary relief will be afforded in cases in which internal remedies and local applications have failed; but conservatism in its use is indicated. The experiments were made on 25 cases, and the effect on metabolism was studied in 3 cases. Frazier's conclusions are as follows: 1. Temporarily increased circulation and respiration, and fever. 2. Moderate fugacious local anesthesia. 3. Loss of weight, probably due to loss of water from skin and lungs. 4. Decreased nitrogenous output. 5. Effects purely local in origin.

Senn² describes **a new incision for arthrectomy, resection**, and for reduction of irreducible dislocation of the shoulder-joint. He states that as success in an operation for tuberculous arthritis depends on a thorough removal of the diseased tissue, the preservation of healthy tissue, and avoidance of unnecessary damage to important structures, therefore the operation which gives wider access to a joint is the object at which the surgeon aims. After tracing the history of shoulder-joint resections from White, in 1768, and describing the different incisions made by various surgeons, he sets forth the following original method: The external incision is made so as to form an oval cutaneous flap, which flap is turned upward, exposing the upper half of the deltoid muscle. Beginning over the coracoid process it is carried downward and outward in a gentle curve as far as the middle of the deltoid muscle, when it is continued in a similar curve upward and backward as far as the posterior border of the axillary space on the same level, or at a point opposite the coracoid. The flap is dissected as far as the base of the acromion and reflected. The acromion is detached with a saw and turned down with the adherent deltoid. The capsule is now widely exposed and free access to the joint-cavity is possible, rendering operative interference feasible. After this the acromion is sutured with catgut, which holds long enough for bony union to occur. The divided deltoid is then sutured with catgut and the flap closed in the usual manner. The scar resulting is well protected by the prominence of the shoulder-joint.

¹ Ann. of Surg., Oct., 1897.

² Phila. Med. Jour., Jan. 1, 1898.

DISLOCATIONS.

Thomas Leidy Rhoads¹ reports a case of **acromioclavicular dislocation**, for which he devised an apparatus to prevent reproduction of the deformity. Pressure was obtained by a trunk-strap about the shoulder and upper forearm. The result was excellent. The apparatus is shown in Fig. 47.

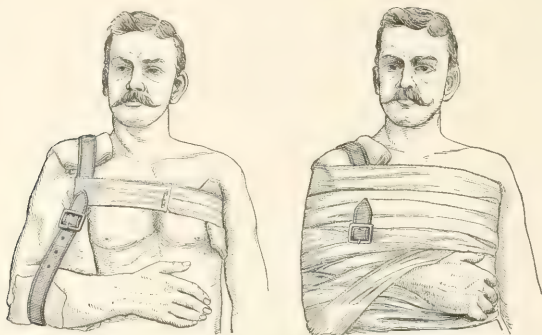


FIG. 47.—Rhoads's apparatus for treating dislocation of the end of the clavicle (Rhoads, in *Ann. of Surg.*).

J. Hutchinson, Jr.,² enumerates the difficulties found in the treatment of **backward dislocation of the first phalanx of the thumb**, and says that all incisions on the palmar aspect of the joint should be avoided. The principal difficulty in reduction, according to some writers, is the position of the long flexor tendon of the thumb, which is found to the ulnar side of the metacarpal head; but Hutchinson claims that the glenoid ligament and sesamoid bones present the real trouble, and concludes that in this annoying deformity careful trial should be given to the manipulation-method of Farabeuf, which consists in flexing and adducting the metacarpal bone, while the dislocated phalanx is hyperextended to a right angle with the metacarpal bone. Traction is then made on the phalanx in a direction parallel to the long axis of the metacarpal. If this fails, a tenotome should be introduced from the dorsum behind the projecting base of the phalanx, so as to divide the glenoid ligament and allow the sesamoid bones to slip on either side of the metacarpal head. It is sometimes necessary to perform the same operation in backward dislocation of the first phalanx of the index-finger.

Charles L. Scudder,³ in a study of 2 cases of **congenital dislocation of the shoulder-joint**, states that but few cases have been reported which were truly congenital, a majority being traumatic and occurring at birth. X-ray examination of his cases shows that the difference between the two conditions consists in the lack of development of the bones of the upper extremity in congenital dislocation, especially the glenoid cavity and head of the humerus, so that the term "congenital misplacement" of the shoulder-joint would be a better term than "congenital dislocation."

Souchon⁴ discusses the **operative treatment of irreducible dislo-**

¹ *Ann. of Surg.*, Jan., 1898.

³ *Am. Jour. Med. Sci.*, Feb., 1898.

² *Brit. Med. Jour.*, Jan. 15, 1898.

⁴ *Jour. Am. Med. Assoc.*, May 7, 1898.

cations of the shoulder-joint, recent or old, simple or complicated. His conclusions regarding resection are that incision should never be made internally (in the axilla) on account of the nerves and vessels, except in rare cases of subglenoid dislocation. The preservation of the circumflex nerve is of great importance. The deltoid muscle should be split as far forward as possible, because all the muscle to the inner side of the cut will be paralyzed. Make the incision a little behind the groove, between the deltoid and the pectoral muscles, on account of the cephalic vein. The tendon of the biceps should be found, and, if torn, it must be stitched. Make the dissection behind the displaced head, and not in front, as it is the posterior part of the capsule that must be taken out of the way. First saw through the anatomic neck or, in some cases, even through the surgical neck. The capsule should be brought over the head, if possible, or some fibrous tissue should be sutured so as to make a capsule. Begin passive motion a few days after operating. Massage and electricity must be applied early and continued for a long time. Extensive movements like abduction should not be made for several weeks after the humerus is fixed in the glenoid cavity. The final results are good for all movements except that of elevation. In some cases there is formation of a new head, more or less irregular. Postmortem examination shows that a fibrous cord, strong and resistant, joins the humerus to the scapula.

Eisendrath¹ writes on **spontaneous dislocation of the hip-joint** occurring during the course of the acute infectious diseases. The generally accepted view as to causation is the theory of Petit—that is, hyperdistention with serous exudate, followed by relaxation of the capsule. Reports of cases show that spontaneous dislocation may occur during typhoid fever, scarlatina, influenza, and acute articular rheumatism. No case has ever been reported occurring during measles. The author's case occurred in the service of his colleague, Sick. Five months after an attack of influenza the patient, a girl aged 11, came to the hospital with the right leg shorter than the left, and a consequent limp, due to dislocation backward of the right femur. On operating, the head of the femur was found in a mass of fibrous tissue firmly attached to the ilium above. The true and false acetabula formed an exact right-angle with each other. But little of the capsule was left, and the ligamentum teres was absent. There were no evidences of tuberculosis. The head of the femur was brought into the acetabulum by strong traction and the wound sutured. The wound healed and some ankylosis persisted.

Whitman, at a meeting of the N. Y. Academy of Medicine, Orthopedic Section, Nov. 19, 1897, presented a boy on whom he had performed an operation 16 months before for **slipping patella**. The capsule had been divided on the outer side, and on account of a hemiplegic contraction considerable difficulty was found in reducing the dislocation. A tuck was taken in the capsule on the inner side. In the discussion, Gibney said he had transplanted a fragment of the tibia with the insertion of the ligamentum patellæ; union was secured and the limb put in plaster, with good recovery.

II. Steudel² reports an unusual dislocation—viz., the **sesamoid bone of the forefinger**, for a sesamoid bone in this location being quite uncommon, its dislocation must be rare. Diagnosis of fracture of the head of the second metacarpal was made at first; but examination with X-rays showed that in addition the cavity of the joint contained the sesamoid. A similar bone was found on the opposite side.

¹ Ann. of Surg., Oct., 1897.

² Centralbl. f. Chir., Mar. 12, 1898.

VENEREAL DISEASES AND SYPHILIS.

M. Lenhartz reported a particularly interesting case of **endocarditis of gonorrheic origin** at the meeting of the Biologic Society of Hamburg, Oct. 12, 1897. Antemortem the diagnosis was made of ulcerative endocarditis, and a diastolic murmur was found over the pulmonary artery. Post-mortem, vegetations were found on the valves of the pulmonary artery, some having become purulent. Intracellular diplococci were found, which were proved to be gonococci by injection into a healthy urethra. The blood found in the heart did not contain any of the germs.

C. Pezzoli¹ claims for **largin**, one of the albuminoid silver compounds, that it is superior to protargol, argentamin, and others of the same nature. It has great power of inhibiting the growth of gonococci, and its power of penetration is great.

Neisser² considers **protargol** a valuable preparation in the treatment of gonorrhea. He begins with 0.25%, and rapidly increases to 0.50–1% solution. The injection is used thrice daily, the fluid being retained for 5 minutes, and the third injection for a half-hour.

Behrend,³ reporting the results of the use of **protargol** in 14 cases of gonorrhea, does not agree with Neisser that it is one of the best of remedies, nor with Frank that it will free the urethra from gonococci in from 1 to 3 days. He has found them in the discharge 3 to 5 weeks after treatment was begun. He concludes that if the germicidal activity of protargol is not sufficient to destroy the germs soon after infection, then the antiparasitic treatment should be abandoned and the astringent method resumed, for the only argument for the use of this drug is the supposition that it prevents the infection from spreading into the submucous tissues.

Werler⁴ discusses the use of **silver citrate** in acute gonorrhea, and claims that the injections are to be begun as soon as the patient is seen. The injections are to be used 4 or 5 times daily at first. The beginning strength should be 1:10,000 in the acute stage, increasing gradually to 1:3000, the temperature of the injection being lukewarm. In the anterior urethra 6 to 8 c.c., and in posterior urethritis 15 to 20 c.c., are to be injected with a special syringe.

Schuster⁵ believes that the gonococcus itself is the cause of **arthritis, pericarditis**, and other inflammations subsequent or coincident to an attack of gonorrhea, and not the toxin. He also thinks that certain joints which are not usually attacked in gonorrhea, the diagnosis being made on their quick response to mercury, may not be syphilitic, but due to Neisser's germ, as he has cured cases by mercury who have never had syphilis.

The use of **guaiaicol** in gonorrheal epididymitis is recommended by Goldberg,⁶ who paints the drug, mixed with an equal amount of glycerin, directly upon the scrotum.

The treatment of **gonorrhea in children** is the subject of a paper by J. Janet,⁷ whose experience has entirely been in cases of little girls. He has found the localizations of the gonococci to be less frequent than in women, because the urethrovulvar glands are less developed; the more frequent sites being the vulva and vagina, more rarely the urethra and rectum, and exceptionally the uterus. The diagnosis of urethral infection is made by first wash-

¹ Wien. klin. Woch., Mar. 17, 1898.

² Dermat. Centralbl., Oct., 1897.

³ Berlin. klin. Woch., Apr. 4, 1898.

⁴ Ibid., Apr. 18, 1898.

⁵ Jour. de Méd. de Paris, p. 46, Jan., 1898.

⁶ Deutsch. med. Woch., Aug. 5, 1897.

⁷ Rev. de Thérap. med.-chir., Dec. 15, 1897.

ing out the vulva and vagina with borated water; then introduce through the vaginal orifice an olivary explorer, by means of which a drop from the urethra is obtained. This exploration should be made at least 2 hours after micturition. The treatment is potassium-permanganate (50 cgm. to 1000) irrigations, twice daily at first, and then once. If it is a case of infection of the urethra, the bladder is filled with a solution of potassium permanganate (25 cgm. to 1000), which the child is told to expel. This is done once a day.

The various **complications of gonorrhea** and their treatment are discussed by Janet.¹ In order to find prostatic foci the patient urinates in 2 glasses, retaining some urine in the bladder; he then expels as much urine as the anterior urethra can contain, and the prostate is massaged. The drop then appearing at the meatus is examined, and if gonococci are found, prostatic infection is certain. Search for glandular foci of the anterior urethra is made by massage. The treatment of prostatic foci consists simply of massage of the prostate before each permanganate irrigation. In the treatment of gonorrhea complicated with stricture, if the stricture is large enough (No. 15 F. or larger), it should be disregarded until the gonococci have disappeared, and should then be dilated. If the stricture is of small caliber, dilatation and irrigation simultaneously may be done. In gonorrhea with orchitis, epididymitis, and prostatitis, do not irrigate during the acute stage; but in endocarditis, rheumatism, or general gonorrhoeal complications irrigate.

Chassaing² makes strong claims for **chlorinated soda** in the treatment of **gonorrhea**, having used it for 2 years on nearly 500 patients. It is important that the solution should be made of fresh chemicals and be recently prepared. The injection should be prepared in 3 different strengths: 1 part sol. sodæ chlor. to 48 aq. dest., 1 to 32, and 1 to 24. The solutions should be used at first 3 or 4 times daily, and finally only at bedtime. It was rarely that a patient who took proper care was not cured in 4 or 5 weeks, and a great many are cured more rapidly.

The treatment of gonorrhea by injections of **argonin** is the subject of a paper by H. M. Christian,³ and his conclusions are: 1. Argonin is absolutely unirritating and can be used in solutions of from 1% to 10%. 2. In the great majority of cases it lessens the discharge very rapidly. 3. Its use is generally followed in a short period by disappearance of the gonococci. 4. This disappearance of the gonococci is not in all cases permanent; in fact, there is a tendency to relapse in a number of cases. 5. It has distinct value as a hand-injection in the stationary period; but is of very little benefit in the mucous stage or stage of decline. 6. It produces no results in chronic anterior urethritis.

C. F. Marshall⁴ is not favorably impressed with argonin, and from personal experience fails to see the advantage it has over other drugs. He has had no experience with itrol (silver citrate) or protargol (a silver proteid compound), but objects to all the silver preparations on account of their instability.

The **infectiousness of chronic urethritis** is discussed by E. R. Owings,⁵ and his conclusions are: 1. In many cases of chronic urethritis we are unable to demonstrate the presence of the gonococcus; these cases are probably noninfectious. 2. In any case the possibility of infection as compared to an acute urethritis is small. 3. An urethritis due to an attenuated organism, and consequently modified in intensity, may be contracted from a chronic urethritis. 4. Several negative examinations of the secretion from a chronic urethritis do

¹ Rev. de Thérap., Dec. 15, 1897.

² Jour. Cutan. and Genito-Urin. Dis., Jan., 1898.

³ Therap. Gaz., July 15, 1897.

⁴ Treatment, Jan. 27, 1898.

⁵ Bull. Johns Hopkins Hosp., Oct., 1897.

not prove its noninfectiousness. 5. The infectiousness or noninfectiousness of a chronic urethritis can only be determined by frequent and careful examinations of the secretion, and, if these prove negative, by the nonappearance of the gonococcus after the application of Neisser's test. (This test consists in injecting into the urethra a solution of silver nitrate until inflammation is produced. If the urethritis is noninfectious, the pus resulting from the irritation will be free from gonococci.)

H. Metall,¹ in a clinical experience of 200 cases in which **xeroform** has been used as a disinfectant and dressing-powder in venereal diseases, reports very good results, both in infected wounds, ulcers, chancreoids, and following operations.

H. Pasehki² has used xeroform in over 100 cases of various skin-diseases, including ulcerations, and reports much satisfaction attending the results. The entire absence of caustic action is commended.

R. Hahn³ advises the **aspiration-treatment** of inguinal bubo, and reports 70% of cases cured in a series of 200, three-fourths of the cases requiring only 1 aspiration. After cleaning the cavity with salt solution a gauze compress is used. Operation is indicated when the deep-seated glands are infected. Waelsch⁴ contends that buboes injected with salt solution heal more rapidly than if antiseptics are used.

The treatment of soft chancers by **prolonged irrigations of hot water** (108°-117° F.) is spoken highly of by Malusardi and Bonaduci,⁵ who have treated 41 cases, from 2 to 11 visits being all that were necessary. The irrigations are begun with the water at about 108° F., and the temperature is rapidly increased. Irrigation is continued for a half hour, with occasional interruptions to permit the patient to rest; the ulcer finally being dusted with iodol and a light dressing of cotton applied. The ulcer becomes very red, and it heals rapidly.

The present **treatment of syphilis** is shown by Ramon Guitéras⁶ to have undergone slight change in the last few years. It consists in powders or black wash in the first stage; some mercurial taken continuously in as large doses as can be well tolerated during the second stage; and potassium iodid internally and mercurials externally during the third stage. The field in which the expert syphilographer can do the most good is in the individualization of treatment. The author does not think it wise to give mercury in the primary stage, except in unusual cases. The protiodid in $\frac{1}{8}$ or $\frac{1}{4}$ gr. pills is the favorite drug in the secondary stage, although the writer likes the tannate in pills of $\frac{1}{2}$ gr. to 1 gr., and as much as 5 gr. of this drug can be given daily. Mercurial inunctions are useful in severe cases and when internal treatment is not well borne. The author's method in secondary syphilis is mercury for 1 year, mixed treatment for 1 year, the latter consisting of biniodid and potassium iodid. After the 2 years' treatment, every spring and fall for 2 or 3 years about 6 weeks of mixed treatment should be taken. Tertiary symptoms are treated by potassium iodid internally and mercury externally in some form, as ung. hydrarg. ammoniat.

Taraskevitch⁷ distinguishes between the risks of **contagion** from late secondary and true tertiary lesions. Secondary lesions may show themselves 10 years after the appearance of the initial sore, and are always contagious. The mild cases with a tendency to frequent relapses are those which remain

¹ Wien. med. Presse, No. 39, 1897.

² Wien. klin. Rundschau, No. 42, 1897.

³ Mittheil. a. d. Hamburg. St. Krk. Aualtalen, 13, 1898.

⁴ Sem. méd., Apr. 6, 1898.

⁵ Ibid., Sept. 8, 1897.

⁶ Phila. Med. Jour., Apr. 23, 1898.

⁷ Ann. de Dermat. et Syph., Oct., 1897.

contagious the longest. The author believes that some cases of tertiary syphilis have been shown clinically to have been the source of contagion.

In the *Arch. de Méd. navale*, Apr., 1898, Touren discusses the **intramuscular injection of gray oil** in the treatment of syphilis. Gaucher formulated the following propositions at the Moscow Congress: 1. Mercurial injections in the treatment of syphilis should be the exception and not the rule. 2. When injections are employed, the soluble salts of mercury are preferable to the insoluble. 3. If an insoluble salt has to be used, the "gray oil" is the least objectionable. Touren agrees with the third proposition, but disagrees with the first two. There are some patients in military hospitals who wilfully keep their sores open and throw away their medicine. In warm climates the digestive tract has to be treated with greater care. By the intramuscular method no digestive trouble is caused, and the patient certainly gets his mercury. Touren found injection of the "gray oil" not only to be painless, but also to produce better results than other salts of mercury. His formula is: Purified mercury, 20 gm.; lanolin, 5 gm.; vaselin, 35 gm. Injections at intervals of 15 or 20 days with a Pravaz syringe.

A. Neisser¹ considers the results obtained by treating syphilis with **injections of blue ointment** to be chiefly due to the inhalation of the vapor of mercury, which the warmth of the patient's body is constantly causing to be given off, and not to the actual amount of the drug which makes its way through the skin. His method of application is to apply 4 gm. of 50% ointment at bedtime, increasing the amount by 1 gm. every tenth application. Forty-two applications are usually made.

Orville Horwitz² reports 4 cases of secondary syphilis complicated with chronic appendicitis, in which a continuous course of **tonic doses of mercury** produced subsidence of the symptoms of appendix-inflammation. "The histories of these 4 cases seem to be of more than usual interest. Catarrhal forms of appendicitis, where the individual may have had one or more acute attacks of the malady, are the experience of all; but the chronic form of appendicitis following acute attacks to succumb to the employment of tonic doses of mercury appears remarkable and well worthy of further consideration. All these cases were so well marked that any surgeon would have considered himself justified in operating."

Pielicke,³ in a paper on **sypilitic joint-affections**, calls attention to the fact that the bone and capsule are more frequently the seat of the primary attack, the cartilage being involved secondarily. The joints which suffer chiefly are the knee, small articulations of the hands and feet, wrist, hips, ankles, and sternoclavicular. When the capsule is the seat of invasion there are usually multiple gummatous deposits, effusion into the joint, capsular thickening, and some ankylosis. If the bone is involved, there are usually periostitis and osteomyelitis. Mercury should be given hypodermically or by inunction, followed by the administration of potassium iodid.

Mercury cyanid is preferred by Druault⁴ for intravenous injection, 1 c.c. of a solution of 1 gm. of cyanid to 100 gm. of distilled water being injected in a vein at the bend of the elbow after a rubber tube has been tied around the member above. The needle is inserted in the vein inclined toward the root of the member and pushed in another centimeter. It is then unscrewed from the syringe to note, by the flow of blood, if it is in the vein. The injection then proceeds. Druault states that neither thrombosis nor embolism has ever been observed.

¹ Volkmann's Sammlung klin. Vortr., No. 199, Dec., 1897.

³ Berlin. klin. Woch., Jan. 31, 1898.

² Ann. of Surg., Jan., 1898.

⁴ Presse méd., Apr. 9, 1898.

DISEASES OF THE BRAIN AND NERVES.

Obalinski¹ describes the **technic of trephining** of the cranium by means of the Gigli saw. In order to perform this operation from 5 to 7 trephine-openings are made, 2 at the base of the bone-flap, 2 at the summit, and the others at the borders. With an elevator the dura mater is separated, the wire saw of Gigli is introduced from one bone-opening to another, and the bone between the two openings is cut from within outward. In this manner an osteoplastic flap is made and broken down, exposing the dura mater.

W. W. Keen² writes on the use of **the Gigli saw to obtain access to the brain**. He says that these saws consist of a bit of roughened steel wire about 35 cm. long and $\frac{5}{16}$ mm. or more in diameter, with a loop at each end. The method of using the saw is to make two or more trephine-openings, separate the dura from the skull, pass a piece of silk through by means of a probe, and draw the saw under the osseous bridge by means of the silk. Attach a handle to each end of the saw and cut outward. Keen reports a case in which he employed this method, and says that it possesses distinct advantages. In sawing the 3 sides of the osteoplastic flap he was able to bevel the edge, so that when the flap was replaced it would not sink in and press upon the brain. By leaving a small portion of bevelled surface in the middle, or at any point, the bone will be separated perfectly; the saw is so thin that there is practically no loss of bony tissue from its use. Another advantage is that we are able to prevent the difficulties sometimes encountered of breaking the bone along the fourth side of the quadrilateral osteoplastic flap. We can saw partly through the thickness of the base of this flap from the inside, and then break the outer table with little trouble, forming a regular fracture. The saw avoids the jarring of the skull caused by the hammer and chisel, although this advantage is theoretical, the author never having seen the use of the hammer produce injury. After one of these saws has been used it curls up and is useless.

Gigli³ writes upon **osteoplastic craniectomy**. He describes the use of the fine saw which he devised. He says that the wall of the skull should be perforated at 4 places by drills. The saw is passed from one opening to another, and the bone is divided between each pair of openings. At the lower portion just enough bone is sawn through to make breaking easy. The chief difficulty consists in passing the saw from opening to opening without injuring the membranes or compressing the brain. The procedure is rendered easier if we introduce into each opening a grooved sound which is curved. This instrument is used as a guide, and a thin strip of flat whalebone can be passed between the dura and bone without causing any harm. The saw is attached by a bit of silk to the piece of whalebone, and is readily drawn through. If the dura is found adherent to the bone, he advises encircling the whole area by a loop of thread, which enters at one of the lower cranial openings and emerges from the other. The free ends of the thread being pulled upon tear through the adhesions and separate safely the dura from the bone. E. Braatz⁴ writes on trephining by the use of the Gigli saw. He states that in this method we avoid the concussion produced by the hammer, and the flap which is cut out fits accurately when replaced. The edges of this flap can be shaped either straight or bevelled. He drills the holes by means of a special form of auger and drill which he has devised. He passes the saw by means of a curved sound. The trephine-holes subsequently serve for drainage.

¹ Centralbl. f. Chir., No. 32, 1897.

³ Centralbl. f. Chir., No. 16, 1898.

² Phila. Med. Jour., Jan. 1, 1898.

⁴ Ibid., Jan. 22, 1898.

J. J. Buchanan¹ writes on osteoplastic resection of the skull by the use of the Gigli saw, and he considers the method eminently satisfactory.

Tiffany² writes on the **technic of intracranial surgery**. Operations for traumatism should be considered apart from operations for pathologic conditions. In the case of traumatism operation is imperative. It has to be done without extended preparation and very probably with inappropriate instruments. Further than this, the real state of the patient is not known, and there has been no preparatory treatment of any sort. The operative area is often already infected. The condition of the kidneys is a matter of great uncertainty in these cases. Of course, the urine is examined before the operation is undertaken, and if the patient has been brought a long distance in cold weather, or if the skin-surface has been exposed and chilled, albumin will generally be present and casts may often be found; hence an accurate knowledge of the condition of the kidneys is impossible. Furthermore, in operations for traumatic conditions anatomic landmarks are frequently obliterated; and, finally, the head must be opened as the circumstances of the case allow or indicate. In operations for pathologic conditions the reverse of the above state of affairs is met with. Everything is ready, the patient is properly prepared, and the operation is performed at a suitable time. Asepsis is perfect and the condition of the internal organs has been carefully studied. A carefully planned operative procedure is carried out along the anticipated lines. Hence, in considering the results of operation, we must draw a rigid line between the results in traumatic cases and the results in pathologic cases. The very fact that the patient has been injured may induce conditions antagonistic to success which are beyond the surgeon's capacity to remedy—for instance, infection. In all cases of brain-surgery the entire head should be shaved and cleaned. In traumatic cases the head is shaved and the skin scrubbed with green soap and hot water. The ears are cleaned and stuffed with sterile cotton, and the eyes are closed with pads of sterile cotton. If a wound exists, it also must be scrubbed, and dirt which has been forced into the skin must be extracted. A punctured wound should be laid open and scrubbed, and the track beneath the skin ought to be laid open and scrubbed. The edges of bruised or lacerated tissues should be trimmed. If coal-dust or grease has been forced beneath the surface, it can usually be removed by scrubbing with soap and washing with ether and alcohol. Dirt which is ground into bone may be removed by scraping or by the use of rongeur forceps, which bite away a film of bone. In traumatic cases, after the head has been prepared, it may be wrapped in a towel soaked in corrosive sublimate until the surgeon is ready to begin operation. In the nontraumatic case the patient should be prepared the day before the operation, and the cleansing should be repeated just previous to the operation. A solution of sodium bicarbonate is useful in removing dandruff; but it is usually sufficient to employ green soap. The head is shaved and scrubbed with green soap, or a poultice of green soap is applied after shaving and left on for several hours, and the head is then scrubbed. The green soap is removed by washing with alcohol. The scalp is then washed with ether and tied up with gauze soaked in sublimate solution. Just previous to operation this proceeding is repeated. In most cases the best way to uncover the brain is by the formation of an osteoplastic flap, with the base turned toward the blood-supply. The breaking down at the base will be made much easier by cutting across the bone with sharp forceps, and we must take pains after this flap is formed to see that the scalp and the bone are not separated. In spite of the objection raised that the

¹ Med. Rec., June 4, 1898.

² Ann. of Surg., Sept., 1897.

⁹ chisel and the mallet jar the brain, Tiffany prefers them in most cases for opening the skull. If the opening is not large enough, it is enlarged by cutting away the bone with rongeur forceps. If we are operating on the temporal fossa there is no need to replace an osteoplastic flap, because the temporal fascia is so dense that it will prevent sinking in. At the top and front of the skull it is advisable to make an osteoplastic flap, because an ordinary operation will be followed by depression. The time occupied in the operation is chiefly consumed in cutting the bone. In some grave cases it may be well to raise a flap, remove the piece of bone, and replace the skin-flap, and permit healing to take place, and a month or two afterward lift this flap and go on with the operation. This second operation can be then accomplished with great rapidity. Trephining the skull, even in cases which are incurable, may lessen pain in optic neuritis. The dura ought to be cut and turned down as a flap, the line of division being about $\frac{1}{2}$ in. internal to the bone-section, so as to permit of suturing and replacement. Hemostatic forceps arrest skin-bleeding. The T-shaped forceps, with a transverse bar at the top, compress a large area of skin and arrest bleeding satisfactorily. He has never been satisfied with the action of the rubber band around the cranium in preventing bleeding. Bleeding from bone is arrested by Horsley's putty, or pressure with dry gauze. By crushing in the edges of the bone with heavy forceps, bleeding from the diploë has in his cases always been arrested. Hemorrhage from the dura is arrested by passing a thread around the artery and tying the vessel, and the same is true of hemorrhage from veins. It may be possible to suture a wound in the sinus, passing the thread around it; but in many cases gauze-pressure is enough. After exposing the surface of the brain, look for vessels and tie them. They are tied by 2 threads and divided between. A forceps will usually tear off, and should only be used temporarily. He says in some cases *serre-fines* may be useful. In a brain-tumor *sulci* are pushed toward the surface and vessels are ligated much more readily than in normal brain-tissue. In such a case it is well to encircle the growth with ligatures. Tiffany employs sterile silk for this purpose. Parenchymatous bleeding is successfully arrested by gauze-pressure. In some cases the gauze can be removed at the end of the operation; but in most cases it is left in place for 2 or 3 days. As a general rule, Tiffany employs chloroform as an anesthetic, as it probably lessens intracranial congestion. It is well known that ether congests the face, and probably also congests the brain. When the author is operating on the brain he keeps an anatomical cast at hand, in order to make comparisons with the area which is exposed. Electric stimulation of the cortex often gives valuable aid to the surgeon. If searching for a subcortical tumor, note the color of the cortex and its consistency: it will generally be found necessary to make an incision, because some growths have a consistency about the same as that of the brain, and a needle may pass through them without recognition. Incision is much better than puncture. In many tumor-cases the cortex is much displaced; but the question of removing portions of the cortex is of great importance. It is likely when a limited portion of the cortex is removed there is a certain amount of restoration of function; but it is not desirable to remove more than necessary. A circumscribed growth can be removed by a spoon or the finger. Operations on infiltrating growths give very bad results in the long run. If it has been necessary to remove the dura, a piece of gold-foil should be placed between the brain and scalp, in order to prevent adhesions. If it is decided that a bone-flap is necessary, and there is not sufficient natural bone, one of several expedients may be practised. Some surgeons have taken a portion of the periosteum of the tibia and have placed it in this region. Some have removed a portion of

the outer table of the skull, leaving it attached to the scalp and transferring it to cover the defect. In some cases the portion of bone which has been removed is perforated to allow of drainage, and is restored to position. Tiffany sutures the scalp with subcutaneous sutures of silkworm-gut and dresses with sterile gauze. He always drains by the use of a bit of silver wire hooked in the lower angle of the wound. He tells us that the re-dressing is to be carried out with the precautions for cleanliness which characterized the first dressing.

J. Raczynski¹ presents a record of his experience in the treatment of 26 cases of **hydrocephalus** by means of **lumbar puncture**. He thinks the treatment is entirely safe, does no injury whatever to the patient, but gives no permanent gain. In 5 patients who suffered from cerebrospinal meningitis, however, the violent pain, vomiting, and convulsions were greatly relieved by the puncture. In several of the other cases there was some relief of symptoms, the improvement, however, being temporary. Lumbar puncture is a diagnostic aid and mitigates certain symptoms, but it does not cure. [The absence of curative effects seems definitely proved.] Alexander Bruce and Harold J. Stiles,² discuss the treatment of chronic hydrocephalus. It is their opinion that the usual cause of obstruction in these cases consists in the closure of the foramen of Magendie by fibrous tissue, by the adhesion of the tonsils of the cerebellum one to the other and to the fourth ventricle, or the presence of cysts at the posterior and lower aspect of the cerebellum. Stiles drained the fourth ventricle through an opening made in the occipital bone for the treatment of acquired hydrocephalus. He trephined in the middle line, just above the foramen magnum. In these cases he found that the hydrocephalus was due to adhesions between the 2 tonsils of the cerebellum and the sides of the medulla. He separated these parts, and the imprisoned fluid was able to escape. In the subsequent progress of the case large amounts of cerebrospinal fluid escaped from the wound. He thinks that this operation should be tried in case of chronic basilar meningitis, whether tuberculous or nontuberculous in origin.

Schlesinger³ maintains that it is justifiable to operate for the removal of **syphilitic tumors of the cerebrium** if the tumor is not improved by specific treatment, is in an accessible region, is practically stationary in its progress, and is apparently of small extent. He thinks the operation is strongly indicated if the tumor is becoming worse in spite of specific treatment, or if Jacksonian epilepsy develops, even when the tumor is shrinking. He would not perform the operation if basal or spinal syphilis existed, if the patient was very weak, or if there were amyloid changes in the organs. He reports a case which he esteems a success. Schlesinger says that in operations for the removal of tumors we should be careful to injure the cortex as little as possible, so as to prevent lasting paralysis. [Such operations are justifiable if specific treatment has failed. They may improve a patient, but will rarely cure him, because it is the exception to find in cerebral syphilis a single localized lesion. There are usually several or many lesions, blood-vessels are degenerated, and nerve-cells are atrophied over considerable areas.]

Von Bergmann⁴ advocates conservatism in the **surgery of the brain**. He thinks that we should not open the cranium when a positive diagnosis cannot be arrived at, because of the great dangers from shock, infection, edema, hernia of the brain, and scar-formation inducing subsequent epilepsy. In considering tumors, he says that tumors in or near the central convolutions can be recognized most easily and removed most successfully. In

¹ Wien. klin. Rundschau, Feb. 20, 1898.

² Scottish M. and S. Jour., Mar., 1898.

³ Wien. klin. Woch., Jan. 27, 1898.

⁴ Volkmann's Sammlung klin. Vortr., No. 200, Dec., 1897.

these cases an ophthalmoscopic examination should invariably be made. Choked disc will usually be found, and study of its onset, extent, and nature will often enable us to reach a conclusion as to the size of the tumor. If we are sure the tumor is either tuberculous or syphilitic, we should not operate, because general treatment will do more good than will operation; but when we believe the tumor is of another variety, although recognizing that it might be either syphilitic or tuberculous, we should operate. [As von Bergmann has shown, the surgeon is frequently greatly disappointed in operations for tumor. Out of 6 operations for tumor, he failed to find a growth in 5 cases. The formation of brain-scars after operation is a serious menace to the future welfare of the organ, as focal epilepsy may ensue. Brain-scars following operation are far more apt to induce harm if the brain is irritable and predisposed to disturbances because of preexisting disease. Operations in traumatic cases form scars, but these are not nearly so apt to produce harm as are the scars which follow operations for brain-disease.]

Jaboulay¹ has recently **stretched the pneumogastric nerve for epilepsy**. The patient lived. It is asserted that this operation is valuable, especially in epilepsy of cardiac or gastric origin. In some cases the voice is harsh for a few days after operation.

Ricketts² discusses the treatment of **neuralgia of the fifth nerve by ligation of the common carotid artery**. He maintains that when there are no pathologic conditions ligation of this vessel is a safe operation. It is much safer and more certain in its results than are intracranial operations for the relief of trifacial neuralgia. *Tic douloureux* is either produced by congestion or anemia; and when congestion is the cause, ligation of the carotid artery is apt to cure. He tells us that ligation of the artery effects no change in the structure of the ganglion, so that the relief from pain cannot be due to any nutritive alteration produced in the ganglion itself, but must be due to lessening of blood-pressure of the congested area.

Keen³ considers the advisability of **operating for microcephalus**. He reports 18 cases in which he performed craniectomy, the youngest of these patients being 18 months of age and the oldest 6½ years; 5 of them died, 6 seemed to be somewhat improved, and in 7 there was no benefit whatever. It is not possible that the operation can be of benefit in patients with ordinary-sized heads or in those with excessive microcephala, nor in patients more than 7 years of age. Keen concludes that if improvement follows the operation it is usually slight, and that much depends upon the subsequent mode of education. In some few cases of moderate microcephaly the operation is justifiable, and in a small number of patients a slight improvement will follow. In the majority of cases treated there will not be improvement, but no bad result will ensue; but in a certain proportion of cases—that is, from 15% to 20%—the operation may be followed by death.

Holt⁴ makes a report upon **abscess of the brain in infants**. He reports 5 cases of his own, and gives the record of 27 cases in infants and young children. His conclusions are as follows: The condition rarely occurs under 5 years of age. The chief causes are otitis and injury. It is rare in acute osteitis, most common in neglected chronic cases, and generally is preceded by caries of the petrous portion of the temporal bone. If in an abscess of the brain in an infant there is no obvious cause, it is probable that infection was by way of the ear. It is rare for an abscess to follow a head-injury unless the injury fractured the skull; and in traumatic cases, as a rule,

¹ Lyon méd., Apr., 1898.

³ Jour. Nerv. and Ment. Dis., Feb., 1898.

² Jour. Am. Med. Assoc., Oct. 16, 1897.

⁴ Arch. of Pediatrics, Feb. and Mar., 1898.

symptoms arise within 2 weeks after the injury. In the majority of cases of abscess of the brain in infants and children there are focal symptoms. Even when focal symptoms exist they may mislead, because they may be due to meningitis or some other lesion. Only the motor symptoms can be depended on. In most cases there is a very rapid increase in the gravity of the condition; there are fever and a history of injury. In less acute cases, with little or no fever, lumbar puncture will assist in the diagnosis. In some cases in which there are only terminal symptoms, it is impossible to make a diagnosis from meningitis, although in abscess the course of the case is usually slower and more irregular and the temperature is generally lower. Holt does not urge operation unless there are positive localizing symptoms, and the chief of these symptoms, in his mind, is hemiplegia.

W. N. Bullard¹ considers the question of the increase of **intradural pressure in head-injuries**. He concludes that there is an increase in the intradural pressure which accompanies or results from severe injury, even when no large clot exists; that intradural pressure may be partly due to an excess in the quantity of subdural fluid; but this excess is rarely the cause. The chief element is bulging of the brain, apparently caused by congestion of the intracranial blood-vessels and the results of congestion.

B. H. Hartwell² studies the relations of **chronic head-injuries**. He says that the skull is rarely fractured by force applied to the opposite side of the head, except in the case of fractures of the base from blows upon the vertex, and many of these cases are instances of fracture by radiation rather than contrecoup. It is impossible to lay down a certain rule as to the amount of injury inflicted by any given blow. It is not easy to understand how a blow upon a part of the head can injure the brain at or near the opposite side without injuring the skull at all. Knowing that the skull is to a certain extent elastic, we can explain these effects of injury largely by the flow of the cerebrospinal fluid about the brain. If we decide to operate upon a case that has followed injury, we determine the side to be operated upon, not by the external signs of injury, but by a careful study of the signs and symptoms.

W. D. Spanton³ presents the records of 2 cases of **meningocele** which were cured by operation. The first case was a baby, 3 weeks old, which had a large meningocele on the back of the head. The skin was dissected from the tumor and the sac was opened; the posterior fontanelle was occupied by a firm mass, consisting of matted pia and arachnoid. There was no brain-substance in the sac. The base of the sac was transfixed and ligated with catgut, which was tied by a Staffordshire knot. The rest of the tumor was cut away and the skin stitched. The wound healed by first intention. The second case was a boy, 3 months old. The tumor was in the occipital region; a similar operation was performed and the patient was cured. [These cases should, as a rule, be operated upon. If not operated upon, they usually die. If operated upon, many can be saved. In the Prague Children's Hospital 38% of cases of encephalocele were saved by operation, and encephalocele is a much more dangerous condition to attack surgically than is meningocele. It is not wise to operate on encephalocele if there is hydrocephalus, paralysis, or evidence of defects in the central nervous system.]

R. Humphrey Marten⁴ reports a case of **wound of the brachial plexus** in which over a year after the wound secondary suture of the nerves was performed, with recovery of a useful arm. The recovery was not absolutely complete. Some of the fibers coming from the fifth and sixth cervical

¹ Boston M. and S. J., Mar. 24, 1898.

² Ibid., Jan. 6, 1898.

³ Brit. Med. Jour., Oct. 9, 1897.

⁴ Intercol. Med. Jour. Austral., Sept. 20, 1897.

going to the outer cord of the plexus and passing into the musculocutaneous did not properly unite.

Chipault¹ reports 14 cases of **perforating ulcer of the foot** treated by nerve-stretching. He first stretches the internal and external plantar nerves and then the external saphenous nerve, being careful throughout the treatment to keep the ulcer clean. The edges of the ulcer are stitched together and an antiseptic dressing is applied; 12 of these cases were cured. He uses a similar method for the treatment of ulcers upon amputation-stumps and in trophic skin-diseases.

J. Jackson Clark² writes on the **surgical treatment of spastic paralysis in children**. He supposes a case in which the intellect is unaffected and the spasm limited to the muscles of the leg, with resulting talipes equinus, equinovarus, or equinovagus. Electricity and massage have been employed until their uselessness has been demonstrated. Retentive apparatus has been applied in order to try a gradual correction of the deformity; but after months or years the uselessness of such an apparatus becomes evident. It is very uncomfortable; it increases the spasm of the stronger muscles and impedes, rather than helps, progression; and whenever the apparatus is left off for a moment the deformity appears worse than before. Then operative treatment is suggested. Every resisting tendon is cut and the limb is overcorrected and fixed in this position, and so left for 4 or 5 weeks. At the end of this time there will be but slight tendency to the return of the deformity and walking will again become possible, and by exercise of the will the tendency to deformity may be absolutely overcome, the retentive apparatus being dispensed with during the day, and at night only a simple shoe being worn; in this manner the cure may be permanent. In infantile paralysis, in contrast to spastic paralysis, massage and faradism in the early stages help recovery. In spastic cases suitable apparatus prevents the occurrence of deformity, and tenotomies are only used to bring the limbs into shape, and, save in the very slightest case, the retentive apparatus is worn for the rest of the patient's life. Lorenz attributes the good effect of thorough tenotomy in spastic cases to the shortening of the cut muscles, so that their range of action is diminished. In bad cases of spastic contraction of the knee Lorenz excises 1 to 1½ in. of the biceps, semitendinosus, and semimembranosus muscles, and then straightens the knee. He states that he has never seen failure of union in the widely separated ends. For the marked adductor spasm which causes the knees to press against each other, Lorenz has found that in mild cases forcible stretching of the adductors combined with manipulation succeeds; that in more severe cases it is necessary to perform subcutaneous tenotomy; while in the worst cases a portion of the obturator nerve should be excised. If dealing with a case of spastic paralysis in which the mind is almost vacant, it is useless to rectify the malpositions. General chorea is a distinct contraindication. Epilepsy is a contraindication. General rigidity renders improvement of the condition of the legs of but little value to the patient. The paraplegic forms are more amenable to treatment when the chief disability is due to spastic club-foot.

DISEASES OF THE SPINAL COLUMN AND SPINAL CORD.

A. H. Tubby and Robert Jones³ communicated to the Clinical Society of London the results of immediate reduction of **angular deformity of the spine** in 25 cases. They state that angular deformities fall into 1 of 3 classes:

¹ Gaz. des Hôp., No. 127, 1897.

² Lancet, Oct. 9, 1897.

³ Brit. Med. Jour., Nov. 20, 1897.

First, when there is little or no ankylosis and reduction can be easily effected. Second, when there is more union in deformity. These require from 1 to 3 minutes' traction and considerable pressure on the spine. Third, those in which there is firm ankylosis. Interference is justifiable in the first and second forms, but not in the third. They say that the advantages of the method are the ease of fixation, the avoidance of alterations in the chest-walls with displacement of the viscera, and esthetic reasons. It might appear that paralysis was a likely complication of this method, but it has not been met with in this series of cases, and 5 of the cases which had paralytic and paretic symptoms commenced to recover immediately after operation. The second risk is the dissemination of tubercle. Jones and Tubby consider that this is not nearly so likely to occur as in such operations as excision and erosion of joints, where more or less healthy bone-surfaces are apt to be freshly inoculated with tubercle. In no case did any abscess form. In some of the cases the correction seemed permanent. In other cases relapse took place, which was removed partially or entirely corrected by another straightening. The duration of the necessary after-treatment is 2 or 3 years. The President of the Society, John Langdon, called attention to the fact that Sayre 25 years ago advocated forcible extension for the reduction of the deformity. Langdon said that in some of the reported cases the deformity was so slight that it is probable a cure would have resulted from prolonged rest in bed alone. He did not think that forcible correction was always free from danger. Inasmuch as large curvatures indicate extensive destruction of bodies of vertebrae, he asks, How is the gap to be filled up? How soon, too, after deformity has shown itself is the most suitable time for the treatment? Calot addressed the Society and explained at length his method of treatment. He said that he did not attempt any other surgical treatment of Pott's disease than that which had for its object the correction of the deformity. To endeavor to treat paralysis or abscess except by simple puncture, followed by injection, was simply to convert the closed disease into an open one, changing it from one in which there were 95% of cures into one in which there were 95% of fatal results. The attitude of the surgeon should be the same as it is in knee- and hip-disease, in which the effort is to overcome the deformity. The difficulties and dangers of correction of the spinal deformity are no greater than in deformity of the hip or knee. Many hundreds of these operations on the spine have now been done, and it has been conclusively shown that the mortality and danger of paralysis are no greater than 1%. In his first series of 37 cases there was not a single bad result. Réclard has reported 32 cases without an accident; Hoffé, 36 without an accident; and Jones, of Liverpool, 40 without an accident; and up to the present time Jones has performed the operation on 60 cases, with but 1 disaster. Bruns and Jonnesco each lost a child from chloroform. Malherbe lost a child from respiratory trouble, and Billaut 2 or 3 from respiratory trouble. Calot has lost 2 out of 300 cases from respiratory trouble. He has met with 3 cases of paralysis during the first few weeks after operation, out of 600 cases of which notes had been sent to him. We must remember that in Pott's disease paralytic complications occur in 1 out of 5 cases. He has notes of 8 cases in which paralysis was relieved by the method. We should not apply the method to children in an advanced condition of cachexia, because in such children there is difficulty in keeping the plaster jacket accurately applied, and this jacket further embraces the respiratory organs. We should not apply it to children who suffer from cough. We should not apply it to children with abscesses, because an abscess might rupture during manipulation and cause paralysis. The abscess should

be first treated by puncture and injection, and in about 2 months subsequently the deformity can be reduced. We should not apply it to children with fistulae. These fistulae must first be cured. We should not apply it to persons from 20 to 25 years of age with hunchbacks of long standing—that is, of 7 or 8 years' duration, which resist a traction of 50 to 80 kilograms. If the patient is under 20 years of age, the deformity may be corrected when it has existed even so long as 10 years. In reducing curvatures in cases of ankylosis in which we use a traction of 80 kilograms, we break through a number of small osseous masses, producing subcutaneous fractures, as shown by the crepitation which can be felt. These fractures, however, are posterior and in healthy regions. He considers that a preliminary osteotomy is desirable in all cases in which a traction of 100 kilograms fails to reduce the deformity. In some cases bony adhesions in the posterior aspect, especially between the vertebral laminae, can be divided by an osteotomy at the most prominent part of the protuberance. The operation of osteotomy can be performed about a fortnight after an unsuccessful attempt at traction has been made. A fortnight after the performance of osteotomy the wound will be healed and traction may be tried again. In the second group of cases it is necessary to break down the posterior adhesions, and when this is effected the anterior adhesions alone will not prevent reduction if the individual is under 20 years of age. Calot recently performed such an osteotomy by means of a guarded chisel. He is allowing the skin-wound to heal, and will shortly make another attempt at reduction. Should this further effort prove fruitless, he will know that he is dealing with a case of true ankylosis. It will be possible to break down the anterior adhesions which exist in such a case by another operation, by attacking them laterally, taking care to avoid the spinal canal. The author then described the details of his treatment. R. W. Murray stated that he had employed the treatment in 14 cases, and his results were satisfactory, although in 1 of the cervical cases weakness of the lower limbs had followed his operation. In 1 of his first cases the child had since developed general tuberculosis. There was 1 fatal case, but death was not connected with the operation.

Mr. Robert Jones¹ presented a paper on the **immediate obliteration of deformity in Pott's disease**. Surgeons have been fearful of actively interfering with a tuberculous spine, thinking that interference might induce pressure-paralysis, abscess, or dissemination of tubercle. We should remember, however, that palsy in these cases rarely results from bony pressure. In fact, complete paraplegia may come on before the bony deformity is detectable; it may come on with the deformity or may come on with the disease, and it is usually due to thickening of the membranes of the cord. Paraplegia is most apt to occur when the disease is in the upper dorsal region, and bears no relation whatever to the acuteness of the angle of deformity. It sometimes disappears when the bony deformity is still increasing. There may be a deformity in early life which remains quiescent for years, and then paralysis may supervene. The danger of abscess-formation may be exaggerated. For many years Jones has been accustomed forcibly to reduce deformity in cases of surgical tuberculosis occurring elsewhere than the spine, and in very few of such cases has abscess occurred. Constant irritation and slight involvement are much more apt to cause inflammatory mischief than is forcible correction followed by complete rest. Jones has never been able to trace dissemination of tubercle to the breaking down of adhesions in tuberculous cases. Whatever method we follow, paralysis is sure to appear in a certain number of cases. Myers analyzed 1570 cases of Pott's disease, and of this number 270 became paralyzed. Hence it is a

¹ Liverpool Med.-Chir. Jour., Jan., 1893.

fallacy to conclude that when paralysis or abscess appears after forcible reduction that it necessarily resulted from the operative procedure. Both are merely symptoms of the disease. The filling in of the gap between the bodies of the vertebrae presents to the mind a serious apprehension. It is certain that, if an extensive projection has been corrected, a great deal of new bone will be required. It is one thing to reduce the deformity and quite another to render a return impossible. This doubt gathers weight when we remember how apt tubercle is to cause ankylosis of a fibrous nature in joints. If we separate the bodies of the vertebrae $1\frac{1}{2}$ in. and secure fibrous buttress, there is nothing to prevent the return of the angle as soon as the splint is removed. Jones says that in his own cases sufficient time has not yet elapsed to say with authority that the cure is permanent. At least 2 or 3 years must elapse before we can be sure that deformity will not return. Calot says that from 9 to 11 months is the time requisite for complete cure; but Jones thinks that 3 years is the proper limit. The pathology of the affection, however, favors bony rather than fibrous ankylosis. The bony elements are derived from the neural arches, the intervertebral discs having disappeared. Out of 52 cases 2 deaths occurred. In one patient in whom convulsions developed 5 weeks after operation no postmortem was allowed. The other child died, and a postmortem shed little light on the cause of death. Jones then discusses the method of correction. He employs manual extension, makes direct pressure over the hump, and applies a plaster-of-Paris jacket. In some cases he has successfully reduced ankylosed vertebrae, but he considers this procedure much more dangerous than when the ankylosis is not complete. He does not operate in any case in which a large lumbar abscess exists, because of the difficulty in maintaining a hyperextended recumbent posture in the face of such a complication. He would not be deterred by a psoas-abscess. Curves involving several vertebrae are more easily reduced than those involving a few. He would not hesitate to attack a deformity occurring in early manhood, if the ankylosis was a changing one or the disease of short duration. He says that he cannot predict the ultimate results of the method, although he thinks favorably of it. He appends a tabular analysis of his cases.

Bilhaut¹ makes a report to show the **increase in height which follows forcible correction of the deformity in Pott's disease.** All people, old or young, who suffer from Pott's disease, undergo a change in height. The height in the adult diminishes before old age, even when there is no hump. In children the growth of the spine is permanently arrested, and the height increases only by growth of the limbs and head. When the curve is corrected the child regains his powers of growth, and along with this the form of the thorax is corrected and there is marked improvement in vital forces, because the viscera act under better conditions.

A. Chipault,² in severe deformity, advocates cutting down upon and wiring the spines of diseased vertebrae to healthy vertebrae. He also wires in recent cases without deformity.

Leonard Freeman³ reviews the literature upon forcible correction and reports a case of his own. For a time the general condition greatly improved after operation, but later it became necessary to perform laminectomy and remove sclerotic tissue that was compressing the cord. The child improved greatly. In this case it is evident that another forcible correction would have made matters worse. Freeman thinks we are justified in forcibly correcting deformity in reasonably recent cases, when the deformity is not too great and

¹ Ann. de Chir. et d'Orthop., Jan., 1898.

² Rev. de Chir., Nov., 1897.

³ Ann. of Surg., Apr., 1898.

when only moderate force will be necessary, and especially if neuralgic or paralytic symptoms exist which do not improve under ordinary treatment.

Julius Wolff¹ disapproves of forcible reduction. He considers that it endangers the health and also the life of the patient. He says the immobilization-apparatus is unwieldy and uncomfortable, and the prolonged confinement to bed is a great objection. He approves of gradual reduction. This can be accomplished by reducing the deformity a little, applying a plaster jacket, after a time reducing it a little more, and applying another jacket, etc. While the jacket is being applied the patient should be recumbent, and an assistant keeps pressure upon the projection until the plaster sets. Respiration will be much more comfortable if several windows are cut in the jacket. If bony ankylosis exists the surgeon should not break it up, but should rest content with improving the shape of the column above and below the projection. Wolff reports 24 cases treated by this method, with gratifying results.

Tubby² has performed the operation of forcible correction 60 times, and he thinks that it is suitable in certain cases. He says that it should not be used if tuberculosis exists in other regions; in cases where there is so much wasting that the pressure of the plaster jacket would cause sores; in children who suffer from troubles with the respiratory organs; in cases in which there is abscess-formation; in cases in which there is firm ankylosis; in cases in which there is marked alteration in the bony framework of the chest. As a rule, it is not practised on patients over 20. It is not employed to correct a cervical curve; and if used in a cervicodorsal curve it will be found difficult to maintain a correction because of the weight of the head. The great size of the curve does not contraindicate interference. The cases in which the procedure is suitable are those in which the disease is recent; in which the angle of curvature is not fixed, but changing; in which the patient is under 20 years of age and in fair health, and in which there is no general constitutional disturbance. The regions in which interference is most useful are the lower dorsal and lumbar. Some cases that were paralytic and paraplegic recovered the power of movement and sensation after the operation. Tubby does not use the plaster-of-Paris dressing, preferring to this a modified double Thomas hip-splint with a head-rest. This apparatus enables the surgeon to reach the patient more readily if there is any respiratory trouble, and, again, it is not nearly so apt to produce sores. It is most important to watch the patient carefully out of the anesthetic. After he has been a few days in the hospital he can be sent home, coming back for inspection once every second week. At the end of 2 months the splint is removed to see the condition of affairs. The author thinks the method gives a good prospect of cure, with a straight spine.

Lovett³ has given a very judicious judgment on the forcible correction of the deformity in Pott's disease. He says that considerable time is necessary to enable us to estimate the real value of the method. We are taught, and analogy would seem to indicate that this is true, that injury to tuberculous areas makes the tissue more liable to attacks of the bacilli and the general system more liable to fall a prey to disseminated tubercle. We know definitely that the forcible tearing of tuberculous bony tissue may be followed by meningitis or general tuberculosis. Raymond Sinton has reported 27 cases in which he forcibly corrected the deformity in hip-disease, and 5 of these cases developed fatal meningitis within a few months of the operation. Objections to forcible correction of deformity in Pott's disease instantly occur to the mind. Pott's disease is a tuberculosis of the bone of the bodies of the vertebrae, and the

¹ Berlin. klin. Woch., Feb. 21, 1898.

² Practitioner, Jan., 1898.

³ Boston M. and S. Jour., Mar. 10, 1898.

deformity is secondary and simply an incident in the case. In fact, it is looked upon as a conservative measure by which nature endeavors to arrest the disease. The disease is vertebral tuberculosis, and is not vertebral deformity. If the treatment was proposed to cure the disease, it could be discussed on a different basis; but it only seeks to remove a symptom which may be distressing and disabling, but which can be fairly well managed by early and proper treatment. It is desirable, of course, if it can be successfully achieved, to improve or cure the deformity; but the essential of treatment is, first, to cure the disease. The question whether bony repair occurs after this operation is of the first importance. If there is no bony repair, the operation is without value. Ménard has asserted that in Pott's disease bony repair occurs at the sides and backs, but not in the bodies, of the vertebrae. Regnault says there is a specimen in the Musée Dupuytren in which there is a gap in the diseased column, and yet the column is stable. We know that after forcible correction there must be a gap of considerable size. It may measure from 2 to 6 cm., or even more; and there is no evidence at all, except the statement of Regnault, that enough bony repair can take place to support the weight. Chipault, who introduced this method of treatment, lays much stress on ligation of the spinous processes after forcible correction, and not only after forcible correction, but also as a routine method of treating Pott's disease in children, even before the occurrence of deformity. He ligates with silver wire and then immobilizes. In some cases after forcible correction Chipault has clamped the laminae together with an arrangement like Malgaigne's hooks. Without this wiring of the spinous processes or laminae, Chipault mentions that relapse is liable to occur. Calot claims that bony tissue does fill the gap, and that radiographs show it; and he says, further, that when the operation is done in 2 stages weeks or months apart, in the second stage we can distinctly feel the snap of bony tissue. Duerquet possesses radiographs which, he claims, show bony repair; but reproductions of these radiographs do not justify his assertion. Lovett says that the question as to bony repair is still unsettled, and that such a process would be exactly opposite to the usual behavior of bone which is affected with tuberculosis and disturbed by traumatism. We cannot say that it is impossible, but we must not accept it as proved. If bony repair does not take place the operation is of questionable value, unless the spinous processes are wired. Relapses have been reported by Péan, Phocas, and others. One would suppose that the operation was dangerous to life, but the reported deaths have been surprisingly few. In experiments upon the cadaver the cord and membranes have not shown any evidences of injury. Lorenz reports a case in which he corrected deformity to prevent a threatened paraplegia, but permanent paralysis followed. Ménard accidentally ruptured a prevertebral abscess. It has been asserted on theoretical ground that the forcible correction may cause hemorrhage, may open tuberculous foci, and may injure intrathoracic vessels. It is quite obvious that in old cases where union has occurred fracture of the spine will result from attempts at correction which are sufficiently forcible to prove efficient. Malherbe reports such an accident. In Calot's list of 204 forcible reductions there were no accidents and there was no death. Two children died within 3 months, 1 of bronchopneumonia and 1 of meningitis. Of 8 cases of paralysis there were 6 cures within 8 days. In 1 case partial paralysis came on some days after correction. Twenty of his cases walk about, but the results are too recent to command serious attention. He states that the X-rays show that the repair is finished in from 5 to 10 months after operation, as a rule; but that it may require 15 months. Monod states that the statistics of Calot are too good. It must be remembered, however, that Calot operates at Bercy-sur-Mer,

under very favorable hygienic conditions, and can venture on things unsafe in cities. Lovett reviews the results of others who have operated by this method. He tells us that Lorenz and Ménard are the chief critics. Chipault is conservative and cautious, Monod is judicial and sceptical, and the majority are enthusiastic. One who employs this method expects of tuberculous bone in the spine a reparative power tuberculous bone does not possess in other regions. The operation is not attended with much risk, but its real value in permanently maintaining the correction has not, as yet, been proved. It is not necessary to use an unreasonable force, as advocated by Calot; but several gentle corrections may follow each other. Paralysis may often be cured, and the deformity may certainly be temporarily corrected in many instances. The method is bound to be used, probably abused, advocated, and decried until we reach conclusions as to its true value. Enough time has not yet elapsed for its real value to be estimated.

Duplay¹ discusses the **treatment of the large abscesses of Pott's disease**. An abscess may or may not be associated with angular deformity. In the adult they frequently exist without the deformity. The abscesses may arise either within or outside of the thoracoabdominal cavity. When they arise inside they develop slowly and point at a distance. Lannelongue has shown that in these abscesses no pyogenic membrane exists, the abscess spreading from point to point by a process of reinfection. Operation, especially in the case of children, should not be done too early; but a spontaneous cure should be sought for. But in adolescents and adults a spontaneous cure is scarcely to be expected, and operation should be performed earlier than in children. Operation may consist in the injection of such an agent as iodine, camphorated naphthol, or iodoform. Duplay prefers the ethereal solution of iodoform, although in some cases this produces pain, in others gangrene of the skin, and in others iodoform-intoxication; but if not more than 50 to 100 g. of the solution are used intoxication will not occur. This treatment gives better results in children than in adults, but in most instances it should be the first treatment tried. If injection fails, surgical operation should be performed; and surgical operation without previous injection is indicated when the lesion is extensive and deep-seated, or when the skin is thin or about to give way. One incision or several incisions are made in such a manner as to enable us to reach the bone-trouble. The walls of the abscess are scraped, and swabbed with a 5% solution of zinc chlorid. The incision should be sutured, room, however, being left for the insertion of a drainage-tube. This operation frequently produces cure.

B. F. Curtis² discusses the operation for the **spina bifida of young infants**. He says there are 2 great dangers—hemorrhage and loss of cerebrospinal fluid—in addition to the ordinary dangers of sepsis and shock. Such children are often in poor health, and bear operation badly. If hydrocephalus also exists, operation ought to be postponed if possible. Before operation the child's limbs and body should be well wrapped with cotton, fastened by bandages, so as to maintain the body-heat, and the child should be turned upon its face and fastened to a board. If we are dealing with a lumbosacral spina bifida the feet should be elevated; the spina bifida thus takes the highest portion of the spinal canal, and but little cerebrospinal fluid will escape. If the spina bifida is dorsal and small a pillow is placed under the chest, both the head and pelvis being depressed, and the tumor being at the highest point of the canal. The operation should be rapidly performed and all hemorrhage carefully controlled. Incisions into the sac are to be made near the apex of

¹ Sem. méd., Dec. 3, 1897.

² Post-Graduate, vol. xiii., No. 3, 1898.

the tumor, where the vessels are smallest. The treatment of the pedicle varies according to its nature, according to the size of the opening into the spinal canal, and whether nerves pass into the sac. When no nerves pass into the sac the pedicle is transfixed and well ligated by means of silk or catgut. If the opening is slit-like in character, it is closed by sutures; if unimportant nerves enter the sac, they can be cut away. In the lower part of the cord, however, it is not unusual to find in the sac the important nerves which supply the rectum, the bladder, or the lower extremities. No nerve of any size should ever be cut unless we prove its connection to be unimportant, and we can prove the distribution of nerves by the application of electricity. The opening in the canal should be closed by means of silk sutures. In suturing the opening use intestinal needles and fine thread. [A meningocele is the most favorable form of spina bifida to operate upon; but even if the spinal cord is in the sac, we are justified in operating. Frederick Eve has insisted on this, and he tells us if the skin-incisions be made near the base (room, of course, being left for the formation of a flap) there will not be much difficulty in dissecting the skin from the dura, and the meninges, cord, and nerves can be separated from the skin toward the middle line. Eve replaces the cord in the spinal canal and covers it with dural flaps.]

Schiff¹ writes on the **diagnostic value of lumbar puncture**. The therapeutic usefulness of this method he considers insignificant, and there has been but one case in which he has seen benefit follow its employment; this was a woman suffering from epidemic cerebrospinal meningitis, in whom recovery followed lumbar puncture. Puncture may give immediate information in all cases of exaggerated cerebral pressure or irritation. If bacteria are found it is of the utmost importance. If the liquid withdrawn contains no pus and no bacteria, we must not therefore conclude that meningitis does not exist. This objection is of little moment in any case in which there is a question of operative interference, as a positive result would in most cases exclude interference. In a case giving a negative result operation could be performed, and if meningitis existed it would not, of necessity, hasten death. Schiff says that the fluid obtained by lumbar puncture may be turbid or may be clear. A turbid fluid indicates meningitis. The fluid of meningitis, in the majority of cases, spontaneously coagulates if it is allowed to stand. Fleischmann examined the fluid in 55 cases, 18 of which labored under tuberculous meningitis, and in 16 there was fibrin-formation. Of 33 cases in which other conditions existed, coagulation occurred in only 4. Schiff, in his own experience, has had 3 cases of tuberculous meningitis, 4 of epidemic cerebrospinal meningitis, and 21 of purulent meningitis following ear-disease; in all there was coagulation within 24 hours. In 2 cases of brain-tumor and in 1 case of enteric fever with meningeal symptoms, and in a case of uremia with meningeal symptoms, there was no coagulation. A markedly atypical case of tuberculous meningitis was diagnosed solely because fibrin was present, and the diagnosis was confirmed at the autopsy.

Stadelmann² comes to the conclusion, after a large experience, that **lumbar puncture** has no therapeutic value; that it is of value as a diagnostic proceeding if the results are positive, and no conclusions should be drawn from a negative result. He makes a diagnosis of meningitis only when bacteria are found in the fluid which is withdrawn.

Monti³ believes that in tuberculous meningitis lumbar puncture has no value either therapeutically or diagnostically. It is of diagnostic value in

¹ Wien. klin. Woch., Mar. 3, 1898.

² Deutsch. med. Woch., Nov. 18, 1897.

³ Arch. f. Kinderh., Band xxiv., Hefte 1 and 2, S. 94.

epidemic cerebrospinal meningitis if applied in the early stages. Frequent effusion in a case of cerebrospinal meningitis may produce a favorable effect upon the disease. [Thiele has reported from Leyden's clinic 60 punctures in 32 cases. The punctures were made while the patient was upon his side, and in not a case did any unpleasant consequences arise. In a case of epidemic cerebrospinal meningitis the puncture enabled Leyden to make the diagnosis early. In tuberculous meningitis lumbar puncture gives valuable information. In such cases the fluid is clear or slightly clouded, contains cells, more albumin than normal, and in some few cases bacilli. Thiele thinks lumbar puncture has some therapeutic value in serous meningitis, purulent meningitis, and the cerebral complications of chlorosis.]

DISEASES OF THE KIDNEYS AND URETERS.

Albarran¹ maintains that **catheterization of the ureter** will often cure hydronephrosis; but if it fails, the catheter is left in place and exploratory nephrotomy is performed. The instrument enables the surgeon to locate the situation and make out the nature of the obstruction, and aids him in performing ureteropyelostomy. In pyonephrosis it is not proper to perform at once nephrectomy, because the individual's health is impaired and the other kidney is rarely thoroughly competent. Nephrotomy is performed, and later, in some cases, nephrectomy. The fistula of a nephrotomy will close quickly if a catheter is retained in the ureter. Albarran believes that nephrectomy will not cure malignant tumors, recurrence almost inevitably occurring. If an adenoma exists complete nephrectomy should be performed, as the growth will rapidly recur after partial nephrectomy. If one kidney is infected with tubercle, remove it at the earliest possible moment. If the disease involves both kidneys, or, if in unilateral tuberculosis the patient's general condition is bad, the palliative operation of nephrotomy is proper. The author strongly opposes stripping off a portion of the capsule in nephrorrhaphy, as he believes stripping complicates the operation and leads to increase of kidney-sclerosis.

L. Bolton Bangs² writes on the remote results after **operation for renal tuberculosis**. He has collected 135 cases, of which 27 died (operative mortality, 20%). Remote results: No record of 19 cases. Of 89 cases, 40 died within 9 months (general mortality, 29.63%): 45 cases lived from 1 to 8 years (33 $\frac{1}{3}$ %). In patients alive 1 to 9 months after operation, there is a good prognosis. "Total surviving and promising cases," 76, or 56.3%. The author concludes that operation gives better results than simply hygienic treatment.

George Walker,³ in a most interesting and instructive article, discusses **sarcoma of the kidney in children**, and critically reviews the pathology, symptomatology, prognosis, and operative treatment as seen in 145 cases. The article is too long for quotation, but is scholarly and thorough, and is a veritable mine of information.

Abrahams⁴ has found in several cases that swelling and pain of the testicle in men and of the ovary in women have preceded from 4 to 14 days an attack of **renal colic**.

Mendelsohn⁵ presents a study of the treatment of **infections of the upper urinary passages**. When the passages themselves are infected the condition is made manifest by a catarrhal state. The best treatment consists

¹ Gaz. méd. de Paris, Sept. 11, 1897.

² Ibid., Nov., 1897.

³ Ann. of Surg., Jan., 1898.

⁴ N. Y. Med. Jour., Sept. 11, 1897.

⁵ Berlin. klin. Woch., Jan. 17, 1898.

in the administration of such drugs as oil of sandalwood and balsam of copaiba. If the infection is in the urine rather than in the passages, the condition is met by the administration of salol, and preferably by urotropin. In all cases the free use of water is eminently desirable. If a condition of nephrolithiasis exists, water should be given freely, the diuresis being aided by the use of preparations of lithium and alkaline diuretics.

Määso¹ presents a study of 22 cases of suppuration of the fatty capsule of the kidney. In every one of the cases the suppuration was secondary to some other purulent focus. In most cases the initial focus was in the kidney. In some few cases it was secondary to pelvic suppuration. Perinephric abscess may be secondary to suppuration within the thorax. Early in the case the diagnosis is difficult or even impossible. In a well-developed case the diagnosis is usually easy, especially if there is a mass in the lumbar region or edema of the skin. The clinical symptoms are local pain, fever, pressure upon the colon, etc. The treatment consists in prompt evacuation. An oblique incision is made, beginning in the angle between the twelfth rib and the quadratus lumborum muscle, and passing downward and forward for 7 or 8 in. Of his 22 cases, 21 were treated by this method, and 16 recovered.

A. W. Mayo Robson² advocates exposing the kidney without dividing muscles, vessels, or nerves. It is a new application of the McBurney operation for appendicitis. Abbe has performed kidney-operations on the same principle. The incision begins to the inner side of the anterior superior iliac spine, and is carried obliquely backward toward the tip of the last rib. The fibers of the external oblique and its aponeurosis are split and retracted. The fibers of the external oblique are split in a line between the ninth costal cartilage and the posterior superior iliac spine. The fingers are pushed through the split in the external oblique and the fibers of the transversalis are perforated by the fingers and retracted with the external oblique. The transversalis fascia is incised and the perirenal fat exposed. The kidney is reached by pushing the fingers through this fat. In all cases of movable kidney the organ can be brought out of the wound and be explored by incision and needling, or can be examined by the fluoroscope. If a calculus is found, it can be extracted and the wound sutured before replacing the kidney. After finishing manipulations the kidney, if not removed, is replaced (or if not extruded, is left *in situ*). The cavity is sponged, the retractors are withdrawn, and the muscles fall together. It may be thought desirable to suture the muscles with several interrupted catgut sutures. The skin is closed with interrupted sutures of silk-worm-gut. As a rule, not a ligature is needed. Robson reports a number of illustrative cases. He claims for this method the following advantages: "1. There is no division of muscle, and therefore no weakening of the abdominal wall immediate or remote. 2. No vessels are divided, thus not only saving time, but rendering healing *per primam* more likely. 3. No nerves are severed, and therefore paralysis of the rectus and other muscles is avoided. 4. The operation is done with the patient lying on the back, to the great convenience of the anesthetist, the operator, and his assistants, and to the manifest advantage of the patient, who is saved much unnecessary disturbance. 5. The great saving of time as well as the diminution of hemorrhage means lessening of shock, thus rendering operation feasible when it otherwise might be questionable. 6. It is an important fact that diagnosis in kidney-cases, especially in renal calculus, is by no means perfect, and if it can be proved that exploration of the kidney can be done quickly with little or no danger and without any subsequent weakness being left, the physician will be less loath to permit

¹ Centrabl. f. d. Grenzgeb. d. Med. u. Chir., Dec., 1897.

² Lancet, May 14, 1898.

and the surgeon to perform an exploratory operation after all other means have been fruitlessly tried. 7. Lastly, after such an operation convalescence is materially shortened, as the patient may be safely allowed to be up at the end of the second week, or even earlier, since there is no fear of the wound giving way."

Senn,¹ writing on floating kidney, objects strongly to incising and separating the fibrous capsule, because such a proceeding may damage the kidney permanently. Senn believes in extensive removal of the fatty capsule. In his last 4 cases he used no sutures, but excised a large amount of the fatty capsule, scarified the fibrous capsule, and supported the kidney temporarily by a piece of iodoform-gauze. After the operation he applies pressure over the front of the abdomen and insists that the patient shall remain recumbent for a long time.

A. Symons Eccles² writes on the mechanotherapy of movable kidney, and reports several cases in which abdominal massage, exercise, and the application of a pad and belt effected a cure, and also reports a number of cases cured by the rest-treatment. His records of cure are very favorable, and bear comparison with the results of operation. He thinks that the victim of a movable kidney should be first treated by rest and massage, followed by exercise to improve the vigor of the abdominal walls, before they are exposed to the acknowledged though small risk of operation. Delay entails no harm; and if it becomes necessary to operate the patient will, because of the rest, be in better condition to stand it.

Charles Greene Cumston³ writes upon incision of the kidney in cases of uncomplicated lithiasis. After considering the symptoms and diagnosis he discusses the treatment. The patient is placed on the sound side, with a large firm cushion under the loin, the thigh of the diseased side being slightly flexed. Tuffier's incision is the best. It begins at the eleventh rib, "8 cm. from the spinous apophysis, and is carried down to the iliac crest." Such an incision is nearly parallel to the twelfth rib. If palpation shows that the kidney is placed lower than normal, the incision is made "slightly oblique downward and outward;" cut the skin and the subcutaneous cellular tissue, next the latissimus dorsi muscle, the great oblique, the small oblique, and the lumbar fascia. It is not necessary to incise the quadratus lumborum. The aponeurosis which passes to the front of the quadratus is incised and the perirenal fat is reached. In making Tuffier's incision be careful not to open the pleura. In order to avoid this accident, open the aponeurosis of the transverse muscle from below upward, and push the fat and pleura upward with the finger. Open the perirenal fat at the anterior surface of the kidney, and bring the organ up into the incision. If there is any trouble in bringing the kidney into the incision, have an assistant push the organ up by forcing his closed fist under the ribs (Guyon's plan). Explore the organ digitally, and if this is without result, explore with a needle. The needle is pushed into the parenchyma of the kidney, along the convexity, then into the sides, and finally at the hilum. If the existence of a calculus is not revealed, incise the kidney on the uneven border, never into the pelvis (might result in fistula). Before incising the kidney prevent bleeding by digital pressure of the pedicle, or, better, with the pressure of forceps, the blades of which are encased in rubber tubing. Clamp-pressure inflicts no injury, and can be employed without harm for half an hour. (The author's clamp is shown in Fig. 48.) The fingers are passed from below upward along the concave border

¹ Jour. Am. Med. Assoc., Dec. 11, 1897.

³ Ann. of Surg., Sept., 1897.

² Lancet, Jan. 29, 1898.

of the organ, and guide the clamp into place. The incision is from 4 to 10 cm. long, and passes deeply into the parenchyma, so as to open the pelvis. Slight oozing is controlled by temporary packing. A finger introduced into the kidney will locate a stone. The calculus can usually be removed by the finger, by forceps, or by a scoop; but if it sends prolongations into the calices, should be removed only by careful dissection. If no stone is found, a metal bougie should be passed down the ureter to determine if it has lodged in that tube. Tuffier was the first to show that suture of the renal parenchyma can be carried out while the pedicle is compressed, with the result that no hemorrhage occurs when pressure is removed and primary union

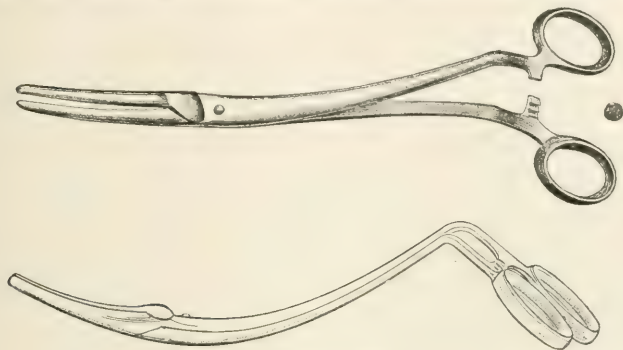


FIG. 48.—Cumston's clamp.

takes place. This method should be followed. A curved needle and stout catgut are employed. The borders of the kidney-wound are held in contact, and from 4 to 8 sutures are passed deeply through the parenchyma. The sutures are tied only moderately tight, because the kidney is empty of blood, and when the clamp is removed the organ will swell and tight sutures will cut. After the suturing the clamp is removed, and not a drop of blood will ooze from the renal cut. The kidney is put in position, the perirenal fat is closed by a continuous suture of fine catgut, and the external incision is closed.

Chevalier and Manclaire¹ report a case of great interest. The patient had the right kidney removed for **pyonephrosis**. One year after the nephrectomy symptoms arose of pyonephrosis of the remaining kidney. Anuria came on, and after complete anuria had existed for 4 days lumbar nephrotomy was performed. The kidney was greatly enlarged, and incision set free about 1 quart of urine. The patient recovered, but every drop of urine continues to pass from the fistula.

Oscar Block² warmly advocates in some cases the removal of small sections of kidney-substance for diagnostic purposes, and reports several cases which emphasize the value of the procedure. Diagnostic resection of a small piece may avert the necessity of nephrectomy by proving that an enlargement is not malignant. Mere exposure and incision of the kidney in some obscure cases of renal trouble effect a cure.

Geo. M. Edebohls³ writes upon the other kidney in contemplated nephrec-

¹ Méd. mod., Oct. 22, 1897.

² Nord. med. Arkiv, Jan. 10, 1898.

³ Ann. of Surg., Apr., 1898.

tomy. If nephrectomy is contemplated, it is necessary to know that the other kidney is present. A number of cases are on record in which a patient's only kidney was removed. Edebohls, in operation, has met with several cases of single kidney, though in no case was nephrectomy contemplated. Palpation will usually, but not always, enable us to detect the presence of two kidneys. An enlarged gall-bladder has been mistaken for the right kidney; and the author made this mistake himself on a patient who had no right kidney. Palpation generally fails to give certain information as to the condition of the kidney. Cystoscopy may give valuable information as to the presence and condition of the kidneys. It should invariably be employed in male or female before nephrectomy is undertaken. It may not be possible, however, to recognize certainly both ureteral orifices. Again, even when watching both orifices we may be misled. Pus-kidneys may discharge purulent matter not constantly, but at irregular intervals, and one or several inspections may be negative. By merely detecting pus, nothing has been learned as to the nature and extent of the disease (whether it be an abscess of the kidney-substance or a purulent nephropylitis). In renal hematuria a cystoscopic examination may mislead. Possibly only 1 ureteral orifice can be recognized. If bloody urine comes from this, we are not sure that the other kidney is not bleeding, and we are not even sure there is another kidney. Another resource is catheterization of the ureters. This is difficult to accomplish in the male, and the attempt may fail. In females it is far more easily accomplished because of the possibility of direct cystoscopy. In hematuria, however, the result may be uncertain, for the catheterization may cause bleeding from the ureter itself. [One author says it does so in 50% of cases.] In renal pyuria it will not tell us the seat nor the extent of the suppurating focus. In many cases of pyuria it is not proper to catheterize the ureters because of the danger of carrying infection from the bladder into a healthy ureter. There is the same danger in unilateral renal or vesical tuberculosis. Skiagraphy may enable us to determine the presence and position of the kidneys; stones, tumors, and sometimes abscesses in the kidney can be skiagraphed. It is, however, often difficult to interpret correctly what we see. There is a final resource for determining the presence and condition of the other kidney. This consists in exploratory lumbar incision, or delivery and examination of the fellow of the kidney to be removed, previous to completing an otherwise indicated nephrectomy. If the kidney is present and sufficiently healthy to justify the nephrectomy on its fellow, it is returned and the diseased kidney is at once removed. Edebohls first employed this method, which is original with himself, in 1894. The author has no fear of a bilateral operation, as he has performed bilateral nephropexy successfully 21 times. The author's method of exposing the kidney is as follows:

"1. Place the patient prone upon the table, and cleanse the entire width of the back in the lumbar region, so as to be ready to cut down upon both kidneys without the necessity of re-disinfection or change of position.

"2. Place the author's kidney air-cushion transversely across the table, underlying and supporting the patient's abdomen.

"3. Incise along the outer border of the erector spinæ muscle, the incision extending in a straight line from the lower border of the last rib to the crest of the ilium. Should the space between rib and ilium be unusually narrow, the incision is made a little more oblique, so that its lower end will reach the ilium a little outside of the lateral border of the erector spinæ. In no case should additional incision, at right or oblique angles to the first, with possible resection of a rib, as still so frequently practised by many surgeons, be made.

The *absolute* necessity for such conditions to the simple straight incision must be extremely rare.

"4. Continue the first incision through the muscles and fascia of the abdominal parietes until the perirenal fat is reached. In cutting through the abdominal wall avoid injuring the large iliogluteal nerve. Its division is followed by postoperative pains and dysesthesie in the upper and outer part of the gluteal region, of which patients complain bitterly, often for months after operation. The intact nerve can generally be hooked either outward or inward during delivery of the kidney. In 3 cases in which the nerve ran directly across the middle of the incision, and it was impossible to deliver the kidney either above or below the nerve, Edebohls divided the latter, and, after returning the kidney, reunited the divided ends of the nerve by suture. In none of these 3 cases did the patients complain of the characteristic pain following solution of continuity of the iliogluteal nerve.

"5. Cut through the perirenal fat until the kidney is reached. Separate the kidney sufficiently from its connective-tissue connections to permit of its delivery.

"6. Deliver the kidney through the lumbar incision. In case the kidney be distended with urine or pus, first draw off the fluid by aspiration, to diminish bulk. At first Edebohls often experienced difficulty in delivering the kidney, until some years ago he hit upon the following method. With it delivery of the kidney, in nearly every instance, becomes a charmingly simple affair. An assistant, standing at the foot of the table, grasps the lower limbs of the patient and draws the patient toward him. In doing so the patient rolls along on the kidney cushion until the latter, instead of compressing the abdomen, comes to lie underneath the anterior surface of the lower half of the thorax. Compression of this portion of the thorax squeezes the kidney out from beneath the ribs, causing it to present fully in the wound. With a little more or less assistance on the part of the operator—sometimes, indeed, without any assistance whatsoever except the above maneuver—complete delivery of the kidney is effected.

"7. Palpation of every part of the kidney, of its pelvis, and of a greater or less length of ureter can now be performed. If indicated, any of the necessary operations upon the kidney—puncture, nephrotomy (exploratory or therapeutic), nephrolithotomy, resection of the kidney, etc.—can be carried out. If a conservative operation be performed upon one kidney, exploration of the other kidney is not called for. Nephrectomy is easily performed by tying the renal vessels and ureter separately with 40-day catgut and cutting the kidney away.

"8. After completion of examination or of operation, except nephrectomy, the kidney is returned within the abdomen. If a healthy kidney has been found movable prior to operation, nephropexy should be performed. Unless drainage of the interior of the kidney be called for, or the wound-surfaces have been soiled by infectious matter, full closure of the lumbar incision for primary union, without drainage, should be the rule. This rule holds good for both incisions, the nephrectomy as well as the exploratory. The writer closes the deep layers of the wound, the abdominal parietes proper, with buried sutures of 40-day catgut, and the skin with the subcuticular suture.

"The patient is out of bed by the tenth day, even after nephrectomy. With the above form of incision the danger of hernia in this region is practically *nil*. The writer has never seen a hernia in this region in his own practice, and the only case he knows of is one reported by Boldt as following a nephropexy."

Oscar Bloch¹ discusses **resection of a portion of the kidney** (partial

¹ Centralbl. f. Chir., Nov. 6, 1897.

nephrectomy). He says the operation is indicated in certain cases of urinary fistula, injury, inflammation, and circumscribed innocent tumors of moderate size. He reports 11 cases. In 1 case he performed a partial nephrectomy for a circumscribed tumor. Examination later proved the tumor to be malignant, but 9 months after operation there was no sign of recurrence.

Villard¹ writes upon **transperitoneal nephrectomy** with previous marsupialization of the peritoneum. After opening the abdomen the surgeon divides the peritoneum over the kidney by a longitudinal cut. The edges of the cut peritoneum are lifted up and sutured to the edges of the belly-cut. This procedure isolates the kidney entirely from the peritoneum and places it in a pocket. In removing the kidney after marsupialization there is no danger of infecting the peritoneum. In infected kidneys this operation renders abdominal nephrectomy comparatively safe. In kidneys so large as to be difficult of extirpation through a lumbar cut marsupialization or abdominal nephrectomy can be done. [Poncet has twice performed this operation with satisfaction. Dänbois recommends the method.]

M. M'Ardle² describes a new method of **nephrectomy**. The incision of Langenbuch is first made; the hand is passed into the belly and the other kidney is examined. The peritoneal layer of the abdominal cut is sutured. A transverse lumbar incision is then made bisecting Langenbuch's incision. The kidney is reached, the fingers are inserted between the peritoneum and transversalis fascia, the flap thus loosened is turned down, and the peritoneum can now be raised from the kidney. M'Ardle advocates this operation because it permits examination of the other kidney; because the peritoneum is saved from infection; because the turning down of the flap affords the surgeon ample room; and because all bleeding-points are visible and can be sutured. The stripping of the parietal peritoneum does not interfere with its vitality, because it carries its own supplying vessels. The extensive division of the muscles is not followed by hernia.

August Frederick Jonas³ contributes an article upon the **surgery of the suprarenal capsule**, and reports a successful case of its removal. Jonas believed in this case that he was dealing with an extranephric affection, but was not certain as to its nature. The patient was a woman of 24, who had borne children. For about a month before admission she suffered from a sharp pain on the right side, below the costal arch, gastric distress, occasional vomiting, and languor. Two weeks before admission a tumor was discovered below the right costal arch. The tumor was tender and movable, and seemed to be in direct contact with the abdominal wall. On admission her general color was pale, but her face and neck and the dorsal surfaces of her hands and wrists were bronzed in appearance. Urine was negative. An incision was made into the peritoneal cavity directly over the tumor. The incision began at the right costal arch and ran downward for 4 in. The tumor was found to be retroperitoneal. The peritoneum over it was incised and stripped off. A healthy kidney was discovered; the tumor was overlying the upper quarter of the kidney, it was cystic, reddish-yellow in color, and extended upward about $2\frac{1}{2}$ in., was adherent to the posterior parietal wall and the lower part of the diaphragm and posterior surface of the liver. It involved the hilum, and more than half of the pelvis of the kidney. The tumor was evidently suprarenal. A second incision running outward from the middle of the first was made. The capsule was enucleated and the kidney removed (because its pelvis was involved). This patient recovered.

¹ Gaz. hebdom. de Méd. et de Chir., Feb. 6, 1898.

² Dublin Jour. Med. Sci., Jan. 1, 1898.

³ Ann. of Sur., Apr., 1898.

The bronzing disappeared during the 3 weeks which ensued upon the operation. The condition was believed by the pathologist to be tuberculous. Jonas reviews the anatomy and the varying views which have been put forth as to the function of the adrenals. It has been proved that "the etiologic factors underlying Addison's disease are not dependent upon the presence or absence of the adrenals alone." He thinks that the chief symptoms of Addison's disease can be produced by lesions of ganglia in close association with the adrenal blood-supply, and maintains that his case strengthens the nervous theory. It has been said that the suprarenal capsules are beyond the reach of surgery, but it is more proper to state that diseases of the adrenals will be brought within reach of the surgeon when they come to be recognized early, before both glands are affected. Both adrenals cannot be removed (at least experimental research so indicates). In removing the adrenals it is necessary carefully to avoid doing injury to the semilunar ganglia.

Orville Horwitz¹ suggests that we can determine positively if a communication exists between a fistulous opening in the lumbar or hypogastric region and the bladder or kidney by administering methyl-blue. If a communication does exist, the discharge will become blue.

Henry Morris² writes upon **ureteral injuries**. Of the 23 reported cases, 11 were examples of subcutaneous injury. Rupture is most apt to occur at the junction of the ureter and the pelvis of the kidney. The usual symptoms are: hematuria; pain in loin, abdomen, and inguinal region; an abdominal swelling, which is usually back of the peritoneum, and is due to a collection of blood and urine; and diminution in the quantity of urine passed. If at first there is little or no hematuria or no lumbar swelling, but after 3 or 5 weeks a retro-peritoneal swelling forms, rupture has probably occurred. The ideal treatment is incision and suture or anastomosis. If the ends cannot be brought together, we must form a fistula and establish lumbar drainage. If infection and suppuration of the kidney follow the ureteral injury, nephrectomy must be performed.

Albarran³ reports a case to show the value of **ureteral catheterization**. The symptoms pointed strongly to hydronephrosis (abdominal tumor, digestive disorder, small amount of urea in urine, occasional attacks of polyuria). A ureteral catheter was inserted on the side of the tumor and was left in place for 48 hours. Examination of the urine from each kidney and from the bladder showed that the urines were practically alike. He rejected the diagnosis of hydronephrosis, opened the abdomen, and removed an ovarian cyst. In another case a kidney-stone was felt by a catheter inserted in the ureter and carried up to the renal pelvis.

Howard A. Kelly⁴ makes a preliminary report on the examination of the bladder and the **catheterization of the ureters in men**. He has recently tested in a case of hematuria in the male the value of his long, straight male cystoscope, which he had made in 1893. In the examination the bladder was emptied and "the patient was placed in the knee-chest position, with the chest close down to the table, the elbows spread apart, and the thighs slightly drawn up under the abdomen." The cystoscope first introduced was straight, 8 mm. in diameter, with a tube 18 cm. long, with a funnel-shaped opening and a small handle. The cystoscope was passed while the patient was recumbent, and after its insertion he assumed the knee-chest position. When the obturator was withdrawn air at once entered the bladder. An electric light was held close to

¹ Jour. Cutan. and Genito-Urin. Dis., Jan. 1898.

² Edinb. Med. Jour., June, 1898.

³ Meeting French Genito-Urinary Surgeons, Oct. 21-24, 1897.

⁴ Ann. of Surg., Jan., 1898.

the sacrum and a head-mirror was used to throw light into the tube. The base and posterior walls of the bladder came clearly into view. There was no growth present. The orifice of the left ureter was visible, and a metal ureteral catheter, such as is used in women, was introduced; the urine drawn contained blood. Kelly found that the handle of the instrument was too small to permit of satisfactory control, and that the speculum-tube was longer and smaller than necessary. This direct method of examination is a great advantage over examination by the "expensive, complicated, and even dangerous" electric cystoscope, and in bladder-troubles will enable the surgeon to apply direct treatment.

Kelly¹ makes a further report upon cystoscopy and catheterization of the ureters in the male. His cystoscope is an open, cylindrical tube, 8 mm. in diameter, 15½ cm. long, with a funnel-shaped opening, blackened on the inside and rim. There is a stout handle attached to the funnel to give a good grasp. The bladder-end of the instrument is rounded off.

The patient is placed upon his back and the bladder is emptied. The urethral orifice is cleansed and oil is injected, and the instrument is grasped as shown in Fig. 49 and is passed into the bladder. The patient is aided in

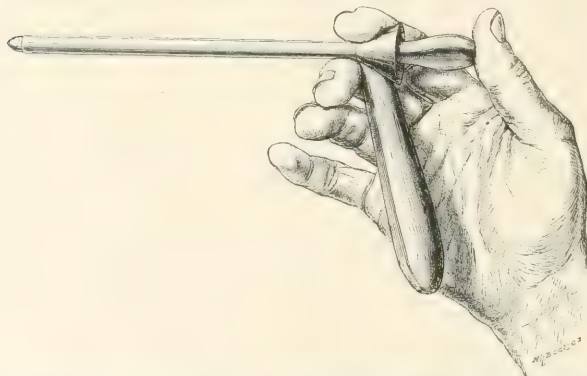


FIG. 49.—Showing Kelly's male cystoscope, reduced to a little less than one-half size; it is held gently poised between the index and middle fingers, and during its introduction the thumb keeps the obturator in place (Kelly, in *Ann. of Surg.*).

assuming the knee-chest position. This position causes the rectum to distend with air. The speculum can be introduced with the man in the knee-chest position. When the instrument is in the bladder the obturator is withdrawn, and air enters into the bladder and distends it. Illumination is effected by direct light or by a light held over the sacrum and a head-mirror (Fig. 50). The ureteral orifices are sought for and the catheter introduced.

E. Hurry Fenwick² makes some remarks on **catheterization of the male ureters**. This procedure is certainly possible, and has been carried out during the past 2 years. By the dexterous it can be easily carried out. It cannot be done with safety in the office, under cocain, unless the patient is under 45, has healthy kidneys and normal urine, and is free from genitourinary tuberculosis; but under such conditions the procedure is not necessary. The patient should

¹ *Ann. of Surg.*, Apr., 1898.

² *Brit. Med. Jour.*, Jan. 15, 1898.

be in bed and should remain there for some hours after exploration. There are two patterns of cystoscope (the Nitze and the Casper, Figs. 51, 52). Fenwick



FIG. 50.—Inspection of the bladder through the long, open cystoscope of Kelly, using for illumination either a reflected electric light (shown in dotted outline), or, better, a direct electric light with a mignon lamp, a reflector, and a condensing lens (Kelly, in *Ann. of Surg.*).

prefers the Casper instrument. This instrument is introduced, the ureteral orifice is discovered, the catheter is made to emerge a little, and is manipulated



FIG. 51.—The Nitze male catheterizing cystoscope (Fenwick, in *Brit. Med. Jour.*).

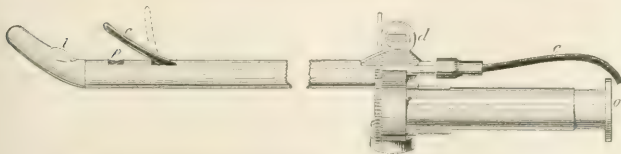


FIG. 52.—The Casper male catheterizing cystoscope (Fenwick, in *Brit. Med. Jour.*).

into the ureter. It is well to give the patient plenty of fluid some time before the operation, in order to stimulate the renal secretion. Fenwick gives Contréville water one hour before. In most instances the operation can be done

under cocain. Sometimes a general anesthetic is needed, and chloroform is preferred, because it interferes less than does ether with rapid secretion. The finding of the ureter will be much facilitated if the urine is stained. This can be accomplished by giving 1 hour before a pill containing $1\frac{1}{2}$ gr. of fuchsin. This drug makes the urine pink.

Alfred Nauman¹ has described a simple method for obtaining the **urine from either ureter in the female**. The idea is to form a septum in the middle of the base of the bladder and thus divide the viscus into two parts. The instrument is a double-barrelled catheter. One extremity is prolonged into a concave piece, so that the bladder back of it can be pressed against it by the finger in the vagina.

M. I. Harris² has devised a most ingenious instrument to obtain the **urine separately from the two kidneys in either sex**. The instrument may be described as follows: "It consists of a double catheter (Fig. 53), each being

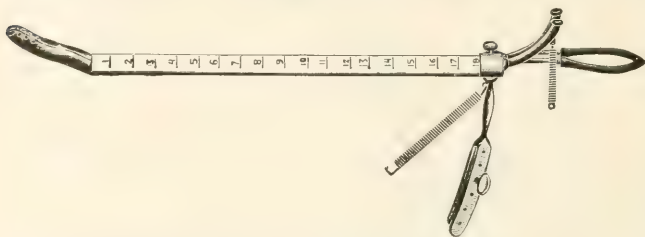


FIG. 53.—Harris's instrument for obtaining urine from each kidney separately (Harris, in *Medicine*).

separate throughout, but both being enclosed in a common sheath throughout its shaft or straight portion, thus giving it the appearance of a single flattened tube. Each catheter is separately movable about its longitudinal axis within the sheath. The sheath is 19 cm. in length, and graduated in cm. along its upper surface. The proximal portion (in reference to the patient) is curved, forming an arc of about 60 degrees of a circle, with a radius of 35 mm. This curved portion does not pass at once into the straight portion, but is set on a slight forward angular displacement about 3 or 4 mm. in length. A transverse section of this curved portion of a single catheter is approximately a semicircle, so that when the flattened surfaces of the two catheters are opposed it is nearly round. In the flattened surfaces and the lateral portions of the semicircular surfaces are a number of small perforations. The distal extremity of each catheter is round and curved in the same plane as the proximal extremity, forming about a quadrant of a circle, the same as the curved end of an ordinary male sound. The curves of the two extremities being in the same plane, the distal end will always indicate accurately the exact direction of the proximal end. At about the junction of the distal curve with the straight portion is a short tube continued in the line of the straight portion and opening into it. The distal extremity of each catheter is connected by means of a short piece of rubber tubing with a separate glass vial. The corks of the vials are doubly perforated, and each vial is finally connected by a piece of rubber tubing with a single rubber exhaust-bulb (Fig. 54). There is a metal lever (Fig. 54) about 29 cm. in length, with a handle at one end, the opposite extremity being suitably curved and flattened laterally. This lever is pro-

¹ Deutsch. med. Woch., No. 43, 1897.

² *Medicine*, Apr., 1898.

vided with a single perforation near the handle, is flattened on its sides, and notched along its lower border. A detachable curved, forked metal piece connects the catheter with the lever when in use. This connecting-piece is provided with a spiral spring arranged to catch in the notches on the under surface of the lever. The instrument is used in the following manner: The patient, male or female, is placed comfortably on a table in the ordinary lithotomy-position, the hips being as high as the shoulders. The instrument, with the flattened surfaces in contact, so as to form practically a single catheter, is introduced into the bladder in the ordinary manner. The connecting-piece is attached. The lever passing through the forked connecting-piece is now introduced into the vagina in the female, the rectum in the male. The fork holds it in the midline. When introduced the proper distance, as indicated by the

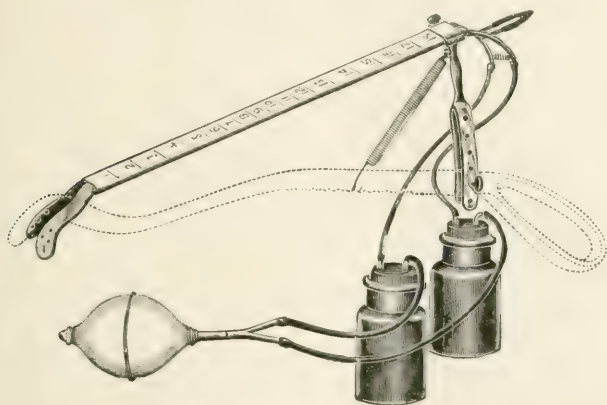


FIG. 54.—Harris's instrument fitted for use (Harris, in *Medicine*).

perforation in the lever coming opposite the perforations in the forked piece, it is fastened by passing the pin in the forked piece through the perforation in the lever. The instrument in the bladder is now opened by slowly and gently rotating each catheter about its longitudinal axis until each proximal end, as indicated by the distal end, is directed outward and backward. The angle subtended posteriorly by the ends of the catheters should be about 100 to 110 degrees. They are held in this position by the small spiral spring. In opening this way, the end of the lever within the vagina or rectum passes up between the ends of the catheters so as to form a septum extending longitudinally along the base of the bladder. The end of the lever is held snugly in between the diverging ends at the catheters by the spiral spring catching in the notches on the under surface of the lever. It will be seen now that the end of each catheter in the bladder occupies the bottom of a little pocket, the pockets being separated by a perfect septum or watershed. The ureters open, one on either side of the watershed, near the base of the declivity in the immediate vicinity of the respective ends of the catheter. By producing a very slight exhaustion of the air in the vials by means of the bulb the urine, as fast as it escapes from the ureters, drops directly into the ends of the catheters and flows at once into the vials, right and left respectively."

Henry Morris¹ gives an able and comprehensive study of the surgery of the kidney. This valuable paper is lengthy, and justice cannot be done it by abstracts. It is worthy of careful study.

DISEASES OF THE PENIS, URETHRA, AND TESTICLE.

Etienne² recommends the treatment of **simple hydrocele** by puncture and the injection of a solution of corrosive sublimate of the strength of 1:1000. The injection causes but little pain, and in a couple of weeks the fluid entirely disappears. He makes a puncture and injects twice with the corrosive sublimate solution, and lastly injects a solution of boric acid.

Miller³ recommends the treatment of hydrocele by the injection of solution of mercuric chlorid. Fifteen cases were cured with 1 injection; in 2 cases a second injection was necessary. He aseptically taps the sac, draws off the fluid, injects 15 minims of a solution containing 1 gr. of bichlorid of mercury and 1 oz. of water, and allows this solution to remain in the sac of the hydrocele. In about 48 hours after the injection it is seen that fluid has reaccumulated, but on the third day this accumulation begins to be absorbed and the patient soon recovers. There is but little pain, and it is not necessary for the patient to stop work.

Block⁴ objects to the treatment of hydrocele by the injection of iodine, because of the pain which follows and the necessity of confining the patient for some time in bed, and because of the fact that there is danger of a relapse. He also objects to the ordinary incision-operation because of the long confinement to bed which is necessary. The author's plan is to make an incision, apply a 3% solution of carbolic acid to the exposed testicle and entire tunica, and pack the cavity with iodoform-gauze. The iodoform-gauze is removed in 3 or 4 days, and the wound is sutured with catgut.

George G. Vanschaick⁵ treats hydrocele by a method he learned in France. After the scrotum has been disinfected the hydrocele is tapped with a small trocar. As soon as fluid begins to flow a catgut ligature is stuffed into the cannula and is pushed into the sac, about 8 in. of catgut being pushed in. When the liquid has all run out the cannula is removed, and the catgut which hangs out of the puncture is cut off close to the skin; the parts are manipulated until the end of the catgut lies within the tunica; the wound is then sealed with collodion.

S. Duplay⁶ considers the operative treatment of **tuberculous testicle**. He states that relapse is the rule after curetting or the use of the cautery. He has performed the following operation in 10 persons: Dissect out tuberculous foci from testicle and epididymis with a knife. If the foci exist in the epididymis, the vas is separated from that structure. After removing a focus from the testicle suture the tunica albuginea with catgut. The skin is sutured. His first operation was performed 7 years ago, and the patient has been well ever since.

Archibald Cuff⁷ makes some remarks on the treatment of **impacted urethral calculi** in children. He says this accident is the most common cause of urinary retention in male children. These stones do not originate in the urethra in children. The nucleus at least is formed in the kidney-substance, and their bulk may or may not be augmented in the bladder. A boy

¹ Hunterian Lectures for 1898; *Lancet*, Apr. 16, 23, and 30, 1898.

² *Gaz. des Hôp.*, Jan. 8, 1898.

³ *Rev. de Chir.*, Feb. 2, 1898.

⁴ *Sem. méd.*, Aug. 27, 1897.

⁵ *Lancet*, Sept. 4, 1897.

⁶ *Med. Rec.*, Oct. 30, 1897.

⁷ *Quart. Med. Jour.*, Jan., 1898.

of 4 has been under Cuff's care on three occasions for impacted stone in the urethra. Some days before each impaction he had pain in the left renal and left iliac regions. These stones are of small size and oblong or wheat-shaped. When in the bladder they float into the internal urethral orifice, the trigone is irritated, vesical tenesmus occurs, and during the passage of urine the stone is carried into the urethra. For hours or days before the stone is carried into the urethra there may have been pains in the penis and perineum during micturition, and blood may appear during the voiding of the last drops of urine. The commonest point for a stone to lodge is just back of the glans penis. Another place where they may lodge is at or a little in front of the bulbomembranous junction. The immediate effects of impaction are retention of urine, vesical tenesmus, and pain in the perineum and penis. The patient endeavors constantly to pass urine, but cannot. The penis is turgid or even edematous, and the child frequently grasps it. The bladder is obviously distended. If we examine the penis or perineum we can nearly always feel the stone. If a soft catheter is introduced it encounters resistance. If the condition is not soon relieved ulceration and suppuration of the walls of the urethra will occur, sudden rupture with extravasation may occur, and atony of the bladder may result. The treatment consists in removing the stone. If it is near the meatus, give an anesthetic, do a meatotomy, and extract the stone with forceps. If the stone is too large to remove in this way, or if it is lodged too far back in the penile urethra, incise the urethra directly over it. The wound should be sutured, silkworm-gut sutures being passed so as to include the submucous coat of the tube and the skin of the penis. Retain a catheter for the first 48 hours. If a stone is lodged near the bulbomembranous junction, it must never be pushed back into the bladder. The perineum is incised, the stone removed, and the urethral wound closed by a series of fine catgut sutures, the skin and other tissues being closed by means of silkworm-gut. Iodoform-collodion is painted over the wound and a catheter is left in place for 48 hours.

Edward Martin¹ read a paper before the section in Genito-Urinary Surgery of the N. Y. Academy of Medicine upon **sterilizing catheters**. He says it is not practicable to sterilize before introduction. The instruments must be kept sterile. The catheter should be solid-ended and smooth within. After the catheter is used it is cleaned mechanically with suds of green soap, and the soapsuds are squirted forcibly through it. The best method of sterilization is to boil the instruments for 5 or 10 minutes and expose them to the vapor of formic aldehyd for 24 to 48 hours. The danger of vesical infection is lessened by urethral irrigation.

Andry² writes on **urethrectomy**. The operation is employed if masses of cicatricial or infected tissue occupy the perineum and are attached to the inferior and lateral parts of the urethra, the roof being intact. This condition is met with in old perineal fistulae. The mass should be removed, and also the portion of urethra attached to it; a total urethrectomy is never done. In a partial urethrectomy the opening of the urethra is examined through a median incision which splits the urethra. The masses are extirpated piecemeal, the urethra being isolated in front and behind the trouble. If obliged to resect 25 or 30 mm. of urethra the surgeon will be unable to suture completely the urethral edges, but must make a new urethra over a sound. If we resect less than 25 mm. and the cut ends can be approximated suture them end to end with catgut, keeping a sound in place. The sutures do not pass through the mucous membrane, and only 4 are used. The perineum is closed as usual. Total ureth-

¹ Jour. Cutan. and Genito-Urin. Dis., Jan., 1898.

² Progrès méd., Jan. 1, 1898.

rectomy removes a segment of the entire canal, including the roof, and is only done in traumatic strictures in which it is not necessary to remove over 25 mm. The urethra is sectioned just back of the stricture and the mass is enucleated. A sound is introduced and sutures are used as before described. It is difficult to introduce the suture in the roof. Leave the metal catheter in place for 5 days and pass a catheter on the tenth day. Only partial primary union may occur, but the resulting fistula will soon heal.

Roosing¹ maintains that urethrectomy should be performed in **impermeable stricture**; in elastic stricture which contracts rapidly after dilatation, especially if there is ulceration or suppuration back of the stricture; if the stricture is of such a character that a sound may enter one day and not another (valve-like or diaphragmatic); if granulations exist and lead to hemorrhage and severe pain on instrumentation; if a permanent fistula remains back of a stricture.

T. A. Fort² writes upon the treatment of **stricture** by weak continuous currents. He considers it a most successful method in urethral and esophageal strictures. The use of electricity was formerly not satisfactory because of improper instruments. Fort has devised instruments which are most satisfactory. In 100 cases the time necessary to divide the stricture was from 60 to 70 seconds. He uses a strength of from 10 to 15 milliamperes. The instrument acts by electrolysis, not by cauterization. In stricture of the urethra only one application is needed; but in stricture of the esophagus several may be required. He has cured 5 cases of esophageal stricture due to swallowing corrosive liquids.

Reginald Harrison³ says urethral strictures may be divided clinically into 3 varieties: 1. Those which are amenable to dilatation; this group includes most cases. 2. Those in which some other measure must be used. 3. Impassable strictures. In the first class the author finds his flexible conical bougie very useful for locating a stricture and for relieving retention. Filiforms are valuable if the stricture is tortuous or pinhole. In the second group dilatation may be impossible or useless because of the existence of false passages, because the stricture contracts rapidly after dilatation, this being due to the presence of a large amount of connective tissue, or because urinary fever follows each attempt. In this group Harrison performs internal urethrotomy with Maisonneuve's instrument. Harrison considers the term impassable, as applied to a stricture, relative, and thinks but few are impassable. For true impassable stricture Wheelhouse's operation is indicated.

Inginni and Arpini⁴ have made a series of experiments in order to determine the ultimate effects of uniting an injured **vas deferens**. They find that a transverse incision unites more readily than an oblique incision. Suture is much facilitated by having a support; but if a support is used, whether it be horsehair, catgut, decalcified bone, or silver wire, although union takes place and the testes appear normal to the naked eye, microscopic examination of the duct shows that the lumen is occluded by connective tissue which forms in the space between the ends, and this space always forms as a result of contraction of the muscular walls.

Nicholas Senn⁵ discusses the frequency of **varicocele** and the limitations of operative treatment for this affection. For years he has been convinced that too many operations have been performed for this condition, and he has taught that we should limit operative interference to exceptional cases with

¹ Klin. therap. Woch., No. 7, 1898, abstract in Med. Rec., May 28, 1898.

² Gaz. des Hôp., No. 5, 1898.

⁴ Il Policlinico, Jan. 15, 1898.

³ Lancet, Apr. 23, 1898.

⁵ Phila. Med. Jour., June 18, 1898.

well-marked symptoms. Most of the victims of varicocele who apply for relief are sexual neurasthenics who have delved deeply into morbid literature, the symptoms being due largely to the mental condition and not to the varicosity. He has often observed that the size of the varicosity bears no relation to the symptoms complained of. His recent experience as a member of the Medical Examining Board has confirmed his previous views. He examined 9815 recruits, and was surprised at the frequency with which he encountered varicocele. It was found more frequently in the robust and strong than in men of slight build, and in most instances the men were otherwise in excellent condition. Atrophy of the testicle was seldom noted. In only 3 or 4 cases of large varicocele was it admitted that the condition gave rise to discomfort or pain. In more than one-half the cases the men were ignorant that they labored under the affection. In a few cases operation had been performed, and in one case had been followed by atrophy and in another by sloughing of the testicle. Senn concludes that varicocele is rarely a cause of disability for military service, and that operative treatment is seldom indicated. In the 9815 recruits there were 21.7% who labored under varicocele. Varicocele existed on both sides in 17 cases, and on the right side only in 15 cases. The most common form was the slight form; next in frequency the medium size; and lastly the large varicocele. Senn is satisfied that in many cases operation is superfluous, provided the surgeon can secure the confidence of the patient, which is an essential prerequisite in treating the mental condition.

T. Dimetresco¹ maintains that partial or total epididymectomy is under some circumstances the proper proceeding in **tuberculosis of the testicle**. The author asserts positively that there is such a thing as primary tuberculosis of the testicle, which may remain localized for a considerable time in the epididymis, and when it does so remain we should not delay interference until the testicle, vas deferens, and prostate are involved, for operation at this time may cure a patient permanently, or at least greatly delay the development of the disease. If the vas deferens is healthy, a partial epididymectomy is performed. If the area of tuberculosis is considerable, a complete epididymectomy should be performed. If only a small portion of the testicle is involved, we can do a complete epididymectomy and remove a small portion of the testicle with it. Epididymectomy is not followed by testicular atrophy. This condition only follow: when the blood-vessels of the cord have been compressed by ligation of the vas deferens or injured during the operation.

Augustus A. Eshner² reports a case of orchitis or **epididymitis as a complication or sequel of typhoid fever**. He presents a study of the literature of the subject, and states that orchitis or epididymitis is a rare complication or sequel, and when it does arise is apt to do so in convalescence. It lasts, as a rule, for a week or 10 days, and generally terminates in resolution; although secondary atrophy or even suppuration may occur. The occurrence of the complication bears no relation to the severity of the attack of fever. In most cases it is due to infection through the blood with typhoid bacilli, although we must bear in mind the possibility of infection by continuity through the urethra with typhoid bacilli or other microorganisms. In most cases the testicle is first affected, and often alone. [The **surgical complications of typhoid fever** are very interesting and important, and have recently been fully discussed by one of the editors (Keen) in a book entitled *Surgical Complications and Sequels of Typhoid Fever*.]

¹ Méd. mod., Oct. 2, 1897.

² Phila. Polyclinic, May 21, 1898.

DISEASES OF THE BLADDER AND PROSTATE.

Tuffier and Dujarier¹ discuss the subject of **total removal of the bladder**, and report a case in which it was successfully performed on a man by Tuffier, the first case in a man upon record. The patient suffered from an extensive alveolar epithelioma. This man subsequently wore a sort of reservoir, which drained him with ease. The authors state that this operation is very rarely necessary. It should only be done when the disease is extensive, but has not invaded structures beyond the bladder, and when the health of the patient is well retained. If the patient has already had suprapubic cystotomy performed, the adhesions around the bladder, as a rule, demand a careful dissection. If suprapubic cystotomy has not been previously performed, an exploratory median incision is made, or, instead of this, cystoscopy is carefully performed. The best incision in this case is the median incision with a horizontal cut at its lower extremity, the horizontal cut extending from one external inguinal ring to the other, and dividing the recti muscles. The peritoneum is easily separable from the anterior surface of the bladder, but adheres to the apex. After separation of the ureters the bladder can be easily separated from behind and on a level with the prostate gland. The bladder is enucleated as the uterus is turned out in a hysterectomy, the liberated portions being brought into the wound. The ureters should be at once divided. They should be secured along with their blood-supply, and divided above the clamps. After removal of the bladder the blood-vessels are ligated, and a catheter is passed into each ureter. Before dividing the neck of the bladder a curved clamp is fastened on it to prevent hemorrhage. After removal of the viscus the hemorrhage is arrested by the ligature and cautery, care being taken to destroy the mucous membrane of the vesical neck in order to prevent infection of the wound. In the female the ureters should be implanted in the vagina. In the male it is better to implant them in the large intestine, but not in the rectum. The sigmoid flexure is the best place in which to implant them.

J. F. Mitchell² reports a case of **rupture of the bladder** in which the continuous bath was used. The patient was first treated by suturing the bladder-wall and draining the prevesical space through a median cut and through incisions in each inguinal region. The next day the patient was placed in a bath at a temperature of 100° F., and remained there nearly constantly for 40 days. The patient began to improve as soon as he was placed in the bath, the condition of toxemia due to absorption from areas of urinary extravasation being greatly benefited. This patient recovered in the most satisfactory manner.

The Medical Society of London discussed the treatment of **tuberculous disease of the bladder**. C. Mansell Moullin³ stated that constitutional treatment should be invariably tried before recourse is had to operation. Drainage at best was only a palliative procedure. In some cases it made the patients worse, the track of the tube becoming tuberculous. The only method of treatment which holds out any hope of cure, or at least any hope of marked relief, is suprapubic cystotomy, which affords access to the disease. It has been maintained by some that this operation is dangerous; that even after it is performed it is impossible to remove the tuberculous material; and that as the tuberculosis of the bladder is almost always secondary the operation, of necessity, must be useless. Moullin, however, asserts that a properly performed

¹ Rev. de Chir., Apr., 1898.² Bull. Johns Hopkins Hosp., Jan., 1898.³ Brit. Med. Jour., May 14, 1898.

suprapubic cystotomy is virtually without risk. It is quite true that removal of the tuberculous area may be very difficult, especially if the diagnosis has been made late. It is essential to arrive at an early diagnosis. The disease from the very beginning causes vesical irritability and hematuria. The cystoscope will detect ulceration, and the centrifugal machine makes the finding of the bacilli easy. He believes that the bladder is usually infected through the blood-vessels and lymphatics. Intact epithelium is a protection against direct infection, and this is proved by the fact that tuberculosis may spread from the kidney to the bladder without infecting the ureter. A bladder-tuberculosis which is secondary to the kidney-tuberculosis is usually manifested by the existence of an ulcer near the ureteral orifice. When the disease is due to infection through the blood or lymph the trigone is the part usually attacked. Moullin has operated on 3 cases of primary tuberculosis of the bladder. One of the cases was greatly benefited, another has remained well ever since. In a third, operation has been performed too recently to permit of a just estimate. Freyer, in debating Moullin's paper, said that the diagnosis of vesical tuberculosis is obscure and the symptoms resemble those of stone; while, however, frequent micturition in tuberculosis of the bladder persists at night as well as day, this was not the case with stone. His experience has led him to believe that the disease is almost invariably secondary, and he was in favor of abandoning the surgical treatment of this affection. The disease generally gets worse after operation, and the suprapubic wound is frequently very long in healing. He does not believe that suprapubic cystotomy is without risk. Battles said that such cases should be divided into two classes; those in which there is a chronic ulcer and those in which granulations involve a considerable area. He thinks that cases of primary tuberculosis are rare, and that such cases only are amenable to surgical treatment. He himself has operated on 6 cases, and in none of them was he able to find evidence of tuberculosis elsewhere; but he admitted that it was often difficult to say whether the disease is primary or secondary. Clifford Beale stated that in the examination of a large number of postmortem records he had not met with a single instance in which vesical tuberculosis was associated with pulmonary tuberculosis. Moullin said, in closing the debate, that if such operations save only a few lives they are worth doing; and if the epididymis or vesiculae seminales are implicated, we need not hesitate to take them away.

Caird,¹ in speaking of **tumors of the bladder**, says that they possess the peculiarity that, whether innocent or malignant, they tend to cause death unless interfered with surgically. In tumors which have widely infiltrated he considers perineal drainage as one of the safest palliative procedures. He thinks that suprapubic drainage gives as great relief and far less inconvenience, because after it has been established the patient can go about, the urine being retained by the application of a suitable appliance. The only other method to be considered in a malignant tumor is extirpation of the growth, and the cystoscope will show us whether an operation should or should not be undertaken. If we find that a tumor can be removed without cutting the ureter, the prognosis is, of course, less serious, and division of one ureter is less serious than division of both. If the ureter is cut, it must be implanted, if possible, into the bladder; if not, in the rectum. Albarran places on record the results of operation for tumor of the bladder: after the removal of innocent bladder-tumors 6.7 % died of the operation; after the removal of malignant tumors 45 % died. In 1892 his statistics showed that in 19 % of cases of innocent growth the tumor recurred after operation; whereas in 1894 the percentage was only 14. He attributes

¹ Scottish M. and S. Jour., Dec., 1897.

this improvement in results to the fact that he now removes with the tumor the submucous tissue which is under it and a considerable area of mucous membrane which is around it. This surgeon has operated on 29 tumors of the bladder, 22 carcinomata, 6 papillomata, and 1 sarcoma. Six of these died, a mortality of 20%. In not one of the papilloma-cases did the growth return.

Edward L. Keyes¹ makes some remarks on the treatment of **stone in the bladder** when associated with hypertrophy of the prostate. His conclusions are as follows: When the stone complicates enlarged prostate, if the condition of the bladder is such that with the stone absent no operation would be called for, then the question of operation is to be determined by deciding whether the obstructive nature of the prostatic hypertrophy, the size of the bar, the depth of the bas fond, the irritability of the prostatic urethra, and the degree to which it resents instrumental interference be sufficiently marked to make litholapaxy impossible, or to make it possible at the expense of leaving the patient's symptoms worse than they were before. If such conditions do maintain, the stone should be removed by the knife. The chief matter is one of diagnosis, and the mere size of the prostate is not a factor in the problem. The size or position of the stone is not a factor, unless it be encysted or be too large for the lithotrite to grasp. Smallness of the stone is an argument against litholapaxy, since in such a condition the symptoms must be due rather to the prostate than to the stone. If the cutting operation is to be performed the suprapubic route should be chosen, as this permits of more perfect work and allows a surgeon to remove obstructions. The only safe guide is surgical judgment based upon diagnosis and by experience.

P. J. Freyer² reports a recent series of **100 operations for stone in the bladder**. It has fallen to his lot to have performed 912 operations for stone: 249 perineal lithotomies, 7 suprapubic lithotomies, 1 vaginal lithotomy, 3 removals of stone from the female bladder by rapid dilatation of the urethra, and 652 litholapaxies. The majority of these cases have already been reported. He now invites attention to his last series of 100 consecutive cases. In this series there were only 2 lithotomies, the remaining 98 cases having been dealt with by litholapaxy. In one of the cutting-operations the suprapubic method was selected for the removal of 2 calculi contained in a cystic tumor. The other patient suffered from stricture of the urethra with perineal fistula. Median lithotomy was performed, and a stricture was at the same time dealt with. Of the remaining 98 cases which were treated by litholapaxy, 94 were males and 4 females; 68 were adults and 30 were children or lads under 17 years of age. In this series of 100 cases there was not a single death. Freyer thinks one of the most essential elements of success in the operation is the use of proper instruments. He uses a Bigelow lithotrite modified by himself, the blades being fully fenestrated instead of non-fenestrated, as they were in the original Bigelow instrument. To manage calculi of all sizes and consistency in patients of all ages a series of lithotrites varying from Nos. 4½ to 18 of the English scale should be at hand. The form of aspirator which he uses is the Bigelow, somewhat simplified. The cannulas vary from Nos. 6 to 18 of the English scale; from Nos. 6 to 11 being necessary for male children; from Nos. 12 to 18 for adults and for females of all ages. The cannulas which he prefers are slightly curved at the end. They are armed with stylets, which should be introduced before the withdrawal of the cannula from the bladder, to prevent a fragment getting impacted in the eye, which would tear the urethra or possibly get lodged in that canal. The stones which

¹ Ann. of Surg., May, 1898.

² Lancet, May 14, 1898.

he removed vary in weight from a few grains to over 3 oz. It is of the very first importance to be able to remove calculi rapidly by this method. If the calculus be large, it is probable that the patient's health is broken down and the kidneys affected, and in such a condition prolonged narcosis will lead to exhaustion, shock, and congestion of the kidneys. Other things being equal, our success will vary in inverse proportion to the length of time we spend in operation. The youngest child he operated on in this series was 1½ years old, and from it he removed in 6 minutes a calculus weighing 3 oz. and 20 gr. The oldest patient was a man of 85 years, who had a hypertrophied prostate. Litholapaxy was performed, and a phosphatic stone weighing 18 gr. was removed. There were 4 females in the series, 1 child and 3 adults. Bigelow's operation in females is easy, and the same instruments are employed as in males. Owing to the width and shortness of the urethra, the water which must be kept in the bladder during the crushing is liable to leak out beside the instruments. This difficulty is obviated by having an assistant place the fore and middle fingers of one hand in the vagina, pressing the posterior lip of the urethra against the lithotrite. Litholapaxy is infinitely safer than the old operation of rapid dilatation of the urethra, for this latter procedure was often followed by urinary incontinence. The time spent by these 100 patients in the hospital or under treatment at home varied from 8 to 20 days, the average being 8 days. Thus 100 operations were performed on 99 persons, there being only 1 case of recurrent stone. The author states that the greatest part of his experience was obtained in India. It has been asked, Is there anything peculiar in the climate of India, or in the constitution of the Hindu, which renders him a better subject for litholapaxy than the European? To both these questions he emphatically answers in the negative. It has been proved statistically in the past that the native of India is not a better subject for lithotomy than the European, and it is therefore difficult to comprehend by what method of reasoning it is alleged that he is a better subject for litholapaxy. The author has had a chance to contrast his experience in India with his experience in England, and he is in a position to speak with authority. There are, however, some interesting features of contrast. The average age of adults he has operated upon in England is 56 years, nearly 11 years greater than the average age of the adults operated on in India. This is due to the fact that the average expectation of life in India is much shorter than in England, an Asiatic being practically as old at 50 as a European is at 60. The average weight of calculi removed from adults in London is 149 gr., whereas his Indian experience shows the average weight to be 309 gr. Further, he meets with a much larger proportion of prostatic patients in England than in India, and this may to some extent account for the larger number of recurrences of stone met with in England than in India. It will be noticed that in no instance in this series was the coexistence of enlargement of the prostate with stone a bar to the performance of litholapaxy, although in many of the cases the enlargement of the gland was very great.

Cunningham,¹ in presenting the records of his 133 operations for stone, says that not over 3% of cases are unsuitable for litholapaxy. The following subjects he thinks unsuitable for litholapaxy: 1. When it is impossible to pass a proper lithotrite for crushing the stone; for instance, when the urethra is too small in children. 2. When a stone is so large that the largest lithotrite will not lock upon it, or when it is so hard that with the greatest force it cannot be broken. 3. When the stone is encysted, when it is associated with a tumor of the bladder, or when it is complicated with one or more calculi in the pros-

¹ Brit. Med. Jour., Aug. 7, 1897.

tatic portions of the urethra which cannot be pushed into the bladder. 4. If it is considered desirable completely to drain and rest the bladder after the stone is removed; when, for instance, there is marked cystitis, with ammoniacal urine, particularly if it is associated with stricture of the urethra. 5. When the bladder is so irritable that it will not retain fluids, even under anesthesia; in such a case perineal lithotomy permits of drainage and vesical rest. If the author is compelled to cut, he greatly prefers the perineal route to the suprapubic; and he uses the suprapubic operation only if the calculi are exceptionally large. He thinks that perineal lithotomy is the proper operation when calculi are encysted or when they are associated with a tumor of the bladder, which it is desirable to remove at the same time.

Richard Baker¹ reports 204 cases of **litholapaxy** performed in India, in addition to 200 which he has already reported. The author feels sure that the operation of perineal lithotripsy will displace lateral lithotomy in dealing with large hard calculi in adult males.

At the meeting of the French Association of Genito-Urinary Surgeons held in October, 1897, M. Chevalier² contrasted **cutting-operations** with **litholapaxy**. Chevalier maintains that those who are not familiar with the operation of litholapaxy are unjust in their criticism. They claim that it is not as surgical as the cutting-operation, which is nonsense; and that it is more dangerous, which is not true. Another objection is that recurrence is more likely because of the difficulty in removing all the débris. This statement has been completely refuted by Guyon and Albarran, and cystoscopic examination shows that the bladder can be completely freed from débris by this method. Recurrence may follow any method, and is due not to the kind of operation, but to other facts, such as suppuration in the bladder or kidney, or the chemical composition of the stone. In fact, by crushing we have greatly the advantage, because it can be frequently repeated. Cutting should, however, be performed when the stone is very large and very hard, when the stones are multiple, and when the condition of the patient or the condition of the bladder is excessively bad. Albarran agreed with Chevalier, but said that we are often uncertain when the operation of crushing is incomplete; therefore he always obtains verification by using the cystoscope one week after the operation. Nitze has suggested that we use the cystoscope immediately, introducing it into the evacuating catheter, but this is an uncertain method in a bleeding bladder. Malherbe stated that he had never met with a stone too hard to crush, and insisted that an enlarged prostate is not a positive obstacle to the lithotrite. Tedenet is accustomed, after the operation is completed, to use a small lithotrite, and then to use it again several days later, in order to be sure that nothing remains in the bladder. Guiard maintained that the small lithotrite and aspirator are of the greatest value in relapsing cases of phosphatic stone. He spoke of a case in which Guyon had done crushing 5 times in a year and a half. With Guyon's consent he had subjected the patient to frequent washings and aspiration with a large metal catheter. He had done this washing out every 5 or 6 weeks for 8 or 9 years, and every time he had done it he obtained small bits of phosphatic concretions, and by this treatment had obviated the necessity of additional crushings.

Eugene Fuller³ describes **chronic contraction of the prostatic fibers** encircling the vesical neck, and its treatment. He maintains that this is a distinct pathologic condition, which may, however, result from persistent functional contraction or spasm. The lesion is permanent, rigid, and unre-

¹ Lancet, Sept. 11, 1897.

² Jour. Cutan. and Genito-Urin. Dis., Feb., 1898.

³ Am. Jour. Med. Sci., Jan., 1898.

laxed, even under anesthesia. If a boutonnière incision be made in the floor of the membranous urethra and the surgeon pass his finger back, the finger-tip will engage in a ring-like contraction in the deep prostatic urethra. This contraction is large enough to admit the tip of the forefinger; hence its presence cannot be recognized by the introduction of a sound from the meatus. The only true symptom dependent on the lesion is inability, complete or partial, to void urine, the condition being at first intermittent, but finally permanent. The treatment consists in making a boutonnière opening and tearing apart or cutting the fibers.

Chas. W. Cathart¹ writes upon the surgical treatment of **enlarged prostate**. Surgical interference becomes necessary when the use of the catheter is attended with growing difficulty, when the amount of residual urine increases, or when attacks of cystitis occur, the patient being as yet free from kidney-disease. The patient can choose between prostatectomy and unilateral vasectomy; the latter operation, it may be, being subsequently performed on the other side as well. The mortality of these procedures is at this stage only 3% or 4% (prostatectomy having a slightly higher mortality). The result of a prostatectomy may not be permanent, but the individual's sexual power is retained. If double vasectomy is performed, the patient becomes sterile (although not impotent for some years) and the condition is permanently cured. From this stage, as the case advances the risk of each operation increases, but the indication for operation becomes more and more positive. Vasectomy is selected if the entire prostate can be felt by rectal touch to be enlarged, where it is soft, and where there is no reason to assume that the chief trouble is a valve-like obstruction at the neck of the bladder. If these conditions do not obtain, prostatectomy is chosen. In a very advanced case even vasectomy becomes very dangerous. We should, if possible, tie a catheter in place for permanent suction-drainage; but if this cannot be done, we must use suprapubic puncture and drainage or perineal puncture and drainage.

James McMunn² has devised an instrument to detect **prostatic hypertrophy** when this condition cannot be made out by rectal examination. It is especially useful when obstruction is due to a middle lobe. The instrument is a straight urethrometer. A rubber catheter is slipped over its tip and introduced into the bladder. The catheter is withdrawn and the urethrometer remains in the bladder. As the urethrometer is withdrawn the blades expand, and the degree of expansion is registered on a dial.

Albarán and Notz,³ as a consequence of experiments on animals, recommend the treatment of prostatic hypertrophy by **angioneurectomy** rather than by castration. This operation consists in resecting all of the cord-elements except the vas, with its artery and vein. Albarán has performed the operation on a man, but too recently to permit of a judgment as to its value. At the same meeting Notz stated that in some cases 38 days after castration the prostate showed no trace of atrophy; and yet, even without atrophy, the symptoms may be cured. Leguen maintains that castration may produce cure or may fail utterly. If cure very rapidly follows operation, the enlargement was congestive; if cure gradually follows, the enlargement was dependent on glandular hypertrophy. Sclerotic prostates are not improved by the operation. Chevalier reported a case of enlarged prostate which vasectomy and cystotomy failed to cure, but which was cured rapidly by castration; a case in which castration produced no benefit, but which improved when a calculus which formed was crushed; and a case in which vasectomy did no good, but which improved

¹ Scottish M. and S. Jour., Dec., 1897.

² Lancet, Feb. 26, 1898.

³ Tr. French Assoc. Genito-Urinary Surgeons, Oct., 1897.

greatly when some vesical calculi were crushed and evacuated. In the last case the prostate shrunk notably after litholapaxy.

Carlier¹ states that there are on record 500 cases of prostatic hypertrophy in which **castration** has been performed. The results vary greatly, some having been very successful and some having been absolute failures. The mortality is 19%, due probably to the previous physical condition. We can understand atrophy of the gland brought about by castration if we recall Albarran's theory that hypertrophy is a "hypertrophic cirrhosis of glandular origin." Notz shows that in 63% of cases the hypertrophy is due to glandular tissue; but we cannot differentiate clinically between hypertrophy due to glandular tissue and that due to connective or muscular tissue or sclerosis. Castration has accomplished many striking cures, but its uncertainty, with other disadvantages, "forbid it a brilliant future." Resection of the vas is still more unreliable, and in the successful cases reported it is probable that proper catheterization would have produced as good results.

Lewis S. Pilcher² discusses ultimate results of castration as a means of relief for **obstructive hypertrophy of the prostate**. In June, 1896, he reported 8 cases of castration and 2 of vasectomy. The relief in these cases was very great, and justified the conclusion that in these "procedures surgery had gained a most valuable resource." He reports 2 additional cases. One was subjected to suprapubic cystotomy and double vasectomy, and was greatly benefited for a time, but obstructive symptoms returned. All of his symptoms were relieved by castration. The other case was relieved of all symptoms by castration. Cabot, from a study of 203 collected cases, estimated the mortality at 19.4%; but death which follows operation is not of necessity due to operation. It is fairer to say that in a considerable proportion of reported cases the conditions preceding operation were such as to entail a fatal result in spite of operation. We cannot deny that in some cases the inevitable end may have been accelerated by operation. In some cases castration should not be done until urgent conditions have been mitigated by other means; for instance, if a patient has advanced uræmia; if he has profound sepsis because of a suppurating prostate or kidney, or a necrotic bladder; if the bladder is over-distended and has produced pressure-effects on the kidneys; if a patient is worn out with suffering due to vesical stone. In 2 of Pilcher's cases he performed suprapubic cystotomy, and kept up drainage for some weeks before performing castration. It is important to consider the effects of castration on the mind, and the later history of castrated individuals is of interest in this connection. In Pilcher's former report he spoke of a man who after operation developed a tendency to dementia. At the end of 3 months he greatly improved. Pilcher has been able to follow 7 cases, and not one of them shows any mental defect, and every one of them remains greatly benefited by the operation.

Freudenburg³ reports a case of prostatic hypertrophy for which Bottini's operation was performed, with most gratifying results, after the failure of castration. The operation was performed twice. After the first operation the urine remained turbid; but after the second operation it became clear. The patient became able to empty his bladder without using a catheter. Freudenburg suggests that castration should not be done until Bottini's operation has been tried. The operation acts by removing an obstruction.

Willy Meyer⁴ writes a valuable article upon Bottini's galvanocautic radi-

¹ Jour. Am. Med. Assoc., Jan. 22, 1898. Cf. address delivered before the French Assoc. of Genito-Urinary Surgeons.

³ Berlin. klin. Woch., No. 46, 1897.

² Editorial in Ann. of Surg., May, 1898.

⁴ Med. Rec., Mar. 5, 1898.

cal treatment for hypertrophy of the prostate. He says: If catarrh of the bladder complicates prostatic hypertrophy, no operation of any kind should be proposed at once. Irrigation of the bladder, with the internal use of urotropin, will do much good. If there is no catarrh, and the case is recent and allows of temporizing, we may try some nonoperative method—Mânassé's plan of rectal tamponade, parenchymatous injection of cocaine into the testicles to produce atrophy, feeding with prostatic tablets—the selected procedure being combined with irrigation. Suppose simple means fail; that the patient is in the fifties and refuses to submit to castration or vasectomy. Shall we recommend prostatectomy, ligation of the internal iliac arteries, or permanent suprapubic drainage? In coming to a conclusion as to the proper course we will receive much help from Freudenburg's paper,¹ in which he calls attention to Bottini's galvanocautic method for the radical cure of prostatic hypertrophy. Bottini removes the obstruction by burning a groove or grooves through the prostate. Meyer considers this operation most successful. He gives a *résumé* of the literature of the subject, and describes the instruments which are employed and the methods of using them. Before performing the operation a cystoscopic examination should be made. This examination tells us if a stone is present, and enables us to know the outline of the gland, which lobe is most enlarged, and if a median lobe exists. In order to confirm the difference in size of the lateral lobes we should outline them by the use of a stone-sound, and also by digital examination. The technic of the operation is as follows: Irrigate and empty the bladder. Anesthetize the posterior urethra by means of eucain or cocaine. One assistant is directed to give his entire attention to the cooling-apparatus, seeing that the outward flow of water never stops. The current is broken and the instrument is introduced. Bottini burns 3 grooves at 1 sitting; a slight one toward the symphysis, one toward the rectum, and a third through the largest lobe of the prostate. In order to burn the groove toward the symphysis raise the handle of the instrument and pull it forward until we feel resistance, after it has entered the bladder. Start the cooling-apparatus and turn on the current. Wait 15 seconds for the knife to get red hot, and then turn the screw, reading the scale to note the progress made. When a groove has been burned return the blade into the female blade, increasing the current slightly while doing so. The current is turned off and the beak of the instrument is turned downward and forward, so as to hug the prostate, and 1 or 2 grooves are burned. The current is turned off and the instrument is withdrawn. The patient can urinate immediately after the operation, and can be gotten out of bed permanently on the second day. There is very rarely bleeding or constitutional reaction.

In over 80 cases Bottini has not had a serious hemorrhage, and he warns us not to use a permanent catheter. The after-treatment is very simple. If necessary, the bladder can be washed out every day with a cold solution (a cold solution stimulates the detrusors). Electricity may be used and strychnin may be given internally to stimulate the detrusors. Meyer has operated by this method 3 times, and considers it a "splendid operation;" but in the light of a death he has had he does not consider it to be always the operation of first choice. He thinks it possible that when pyelitis exists; when the prostate is soft and bleeds easily; when the patient is in poor condition, and the bladder and prostate are not accustomed to instruments, it may be better to do vasectomy or Albarran's operation, and, if this fails, Bottini's operation.

L. Bolton Bangs² writes on the **use of the catheter in prostatic disease**. If possible, use a soft catheter with a solid tip. If we must have a

¹ Berlin. klin. Woch., p. 15, 1897.

² Med. News, Feb. 12, 1898.

firmer instrument, employ one of elastic webbing, the bend being near the point. A new catheter must be cleansed as carefully as an old one. The most certain way is to put it in vapor of formaldehyd. If this is not done, it should be placed in a 2% solution of formalin for 15 minutes, and after this put in a strip of bichlorid gauze or between the folds of a clean towel. Each instrument should be kept separately in its own receptacle or in a closed drawer. If the patient is obliged to carry the instrument with him, the bichlorid gauze is surrounded with waxed paper, which is kept in place with rubber bands. Just before using the instrument the patient cleanses his hands and rinses his fingers with alcohol, the catheter during this time lying in formalin solution. The instrument is removed from the solution, shaken, wiped with dry gauze, and lubricated. It is passed gently. Immediately after using it is washed with soap and water, soaked in formalin, and put away in a clean towel or wrapped in gauze.

Bazy¹ reports some cases of prostatic enlargement in which great benefit was derived from wearing the catheter regularly for long periods (from 1 month to 18 months). After the catheter has been worn some time the prostate becomes smaller and softer, and it becomes possible to catheterize easily; or the patient may even become able to hold his urine several hours and to void it voluntarily. The catheter à demeure is so adjusted that the patient can get about and follow his avocation.

Orville Horwitz² reports some cases to show that it may be impossible to diagnosticate stone in the bladder if hypertrophy of the prostate exists. If castration is performed, the prostate shrinks and a stone can be detected. In each of Horwitz's 5 cases the existence of calculus was suspected. In only 1 case could the stone-searcher be introduced, and in this the enlargement of the middle lobe was so marked that the instrument failed to detect the stone. A surgeon is not to be blamed if he fails to detect a calculus in an individual with enlarged prostate if it is impossible to introduce a searcher, or if the searcher cannot be properly utilized, and if the X-rays fail to show the stone.

Eugene Fuller³ does not believe that **tuberculosis of the prostate** is a frequent disorder, but he knows that tuberculosis "in connection with the deep urethra and the genital tract is of common occurrence." Tuberculosis in connection with the seminal vesicles is common, and is often mistaken for prostatic tuberculosis. Tuberculosis of the deep urethra is more apt to invade the vesicles than the prostate; but a tuberculous ulcer of the deep urethra may be followed by secondary prostatic implication. A primary tuberculosis of the prostate, without antecedent tuberculosis of the deep urethra or genital tract, is excessively rare. Fuller reports 2 cases of prostatic tuberculosis in which necrosis of the gland took place. The prognosis of prostatic necrosis is bad. This is in contrast with the good prognosis afforded by prostatic abscess. Prostatic necrosis can be differentiated from abscess by the gradual onset, the absence of evidence of acute inflammation, and the existence elsewhere of signs of tubercle. An area of prostatic necrosis may become encysted, fibrous tissue forming and the part becoming infiltrated with the salts of lime, or it may soften and break into the bowel or urinary tract.

BURNS, ULCERS, SHOCK, AND PLASTIC SURGERY.

George T. Doolittle⁴ describes a new method of **skin-grafting**. He believes in cutting large grafts, which are of uniform, size by means of a

¹ Presse méd., No. 47, 1898.

² Ann. of Surg., Mar., 1898.

³ Jour. Cutan. and Genito-Urin. Dis., Oct., 1896.

⁴ Jour. Am. Med. Assoc., Mar. 26, 1898.

safety-razor. The use of a large graft greatly lessens subsequent contraction and greatly accelerates the speed of the operation. If we propose to graft a granulating surface which is not ulcerating, we need not scrape the granulations; and in dressing we should not employ a protective, as it causes the grafts to soften. In using the razor he directs us to set the blade forward to the edge of the guard, to grasp the razor between the thumb and the first and second fingers, the thumb at the front of the razor and the first and second fingers pressed firmly against the back of the blade, to keep it from slipping. With the left hand hold the skin tightly just back of where the cut is to begin; hold the blade at an angle of about 45 degrees with the skin-surface. The surgeon cuts toward himself and against the grain, and should not be afraid to bear down until the blade takes hold of the skin. The skin will roll up on the blade as it is cut. We can easily by this method cut a strip 6 or 8 in. long.

E. G. Mumford¹ discusses the medical and surgical treatment of **hare-lip**, and gives the following *résumé* of the important points in the treatment. Harelip babies are not necessarily feeble at birth, and can be kept up to the normal standing by feeding. Before operation the field should be asepticized. We should operate in the sixth to the eighth week, and should not slash with scissors, but should cut and trim carefully with a knife. The upper lip should be freed thoroughly from the jaw. The nares must be anchored with shotted wire. Pins and heavy outside sutures are not to be employed. As dressing, we use crepe lisse and not surgeon's plaster. Heavy inside stitches are applied and are left in place for 6 days. After operation especial attention must be given to proper feeding and to care of the bowels.

W. Joseph Hearn² reported to the section on Surgery of the College of Physicians of Philadelphia a case of **saddle-nose** in which he inserted a gold plate without external incision.

Robert Abbe³ has suggested a new plastic operation for the relief of deformity due to **double harelip**. The operation had been done in infancy, and the man, when at the age of 21, presented himself to Abbe. There were extreme flatness and scantiness of the upper lip and enormous pouting and redundancy of the lower lip, with complete cleft of the hard and soft palates, upon which 2 unsuccessful operations had been performed. The first operation done was to close the palate-cleft, and after this the operation upon the lips was undertaken. He corrected this inequality admirably by transplanting the lower portion of the lower lip into the upper lip. Twelve days after this operation, the flap having grown in its new position, the base was cut from the lower lip and the parts were stitched. The patient recovered and was relieved of his deformity.

C. Willems,⁴ of Ghent, discusses the value of picric acid in the treatment of **burns**, and he maintains that it is only useful in burns of the first and second degrees, its particular action being to stimulate the growth of epidermis. There can be no question that it is of great value in burns of the first and second degrees, the epidermis forming so quickly that suppuration does not occur. It has one great advantage—that is, it allays pain. In burns of the third degree picric acid checks suppuration, but does not hasten granulation. As a matter of fact, though, in practice, we usually find these 3 degrees of burn present at the same time, and in such case it may be advantageous to use

¹ Boston M. and S. Jour., Mar. 3, 1898.

² Ann. of Surg., Mar., 1898.

³ Med. Rec., Apr. 2, 1898.

⁴ Ann. de la Soc. Belge de Chir., An. vi., No. 2, May 15, 1898.

the acid at first, as it allays the pain and rapidly heals the milder burn. At a later stage substitute an antiseptic for the treatment of the granulating surface. Picric acid causes neither pain nor toxic symptoms unless too strong a solution is used. It has been the custom with many surgeons to use a saturated aqueous solution, applying compresses soaked in this to the wound and allowing them to dry. Picric acid is soluble in water to the extent of $\frac{1}{2}\%$. In some Parisian reports we find that they have used solutions of the strength of 5 to 10%. Willem himself places the acid in an ointment of vaselin of the strength of 1 or 2%, and spreads 15 gr. of this upon lint and dresses the burn. He has never seen any toxic effect, and never any pain but of the most transient description. It colors the skin yellow, it is true; but this can be removed by washing with alcohol, or with lithium carbonate diluted with water.

Tommaselli¹ maintains that burns should be treated with **antiseptic dressings**, and at the same time large injections of artificial serum should be administered to the patient. In 1 case so treated two-thirds of the anterior surface of the body was burned, but the patient recovered. In the first day 250 g. of artificial serum were injected, increasing to 500 g. the fourth day, and continuing this to the nineteenth day.

Namé² dresses **contusions** by the application of menthol-collodion, claiming that it allays pain and expedites recovery. The contused part is thoroughly aseptitized, and once or twice a day is painted with a mixture which contains 24 gr. of collodion to 6 g. of menthol.

Turrazza³ makes a report on Mareschi's treatment for **varicose ulcers of the leg**. He reports 3 successful cases. This treatment consists in making a circular incision above the ulcer and another below it, the incision passing down to the deep fascia and the veins being tied, the wound being permitted to heal by granulation, or, if it gape widely, a very few sutures being applied.

Langsdorf⁴ discusses the treatment of **chronic ulcers of the leg**, and he maintains that the most essential element in treatment is disinfection of the floor of the ulcer and surrounding tissue. In order to accomplish this he scrubs the ulcer and leg with soft soap and covers the ulcer with a paste of calomel. Over this he puts ordinary table-salt, and dresses with gauze and absorbent cotton. This mixture of calomel and table-salt forms nascent corrosive sublimate, which produces a burning sensation for 3 or 4 hours. After 24 hours the dressing is removed and the ulcer is washed, and it will now be seen that it presents a healthy, dry surface, although occasionally there may be small sloughs. Healing can be encouraged by the application of ointments containing turpentine. After healing of the ulcer a dressing of zinc-ointment should be worn for a couple of weeks.

Simonelli⁵ treats **varicose ulcers** of the leg by the application of a powder containing 50 parts of common salt and 5 parts of pulverized menthol.

Köhler⁶ writes on the grafting of **ulcers** with Thiersch grafts without removing granulations, and he thinks the results are as favorable as those obtained by the typical Thiersch method. He has performed the operation 14 times. He maintains that the removal of the granulations before the application of the graft is unnecessary, because cicatrization will follow in cases suitable for transplanting quite as surely as when the strips are laid upon the granulating surface.

¹ Sem. méd., July 21, 1897.

² Riforma med., Oct. 30, 1897.

³ Rev. méd., Oct. 6, 1897.

⁴ Jour. de Méd. de Paris, Sept. 12, 1897.

⁵ Centrallbl. f. Chir., Nov. 20, 1897.

⁶ Deutsch. Zeit. f. Chir., Dec. 23, 1897.

X-RAYS.

James P. Tuttle¹ reported a case of **X-ray burn** to the Surgical Section of the New York Academy of Medicine. The patient had suffered very many years from floating bodies in the knee-joint. The attending physician had examined the part for a considerable time with the X-rays. Three weeks subsequent to the examination the part became red, and about 48 hours later the skin sloughed away. This area was skin-grafted, apparently successfully, but after a few weeks it broke down. The man's general health was bad, and he was using morphin in considerable quantities, so Tuttle amputated the thigh. In an examination of the specimen by Vissman it was shown that the destructive process extended down to the capsular ligament, and the walls of the vessels were infiltrated with round cells. In the debate upon this case Bronson stated that the word burn was improper, as X-ray injuries differ from ordinary burns, first, in the length of time which ensues between exposure and development, and, second, in the fact the X-ray injury does not begin on the surface, but begins in the depths and subsequently involves the surface. The gangrenous process which develops is probably due to some disorder of the nervous system. Tuttle stated that remedies which were useful in ordinary burns were useless in X-ray injuries; in fact, seemed to make them worse. He stated that all X-ray injuries so far reported arose when the X-rays were generated by the Ruhmkorff coil. He stated that Seneca D. Powell had successfully treated several cases by excising the area. This is a valuable point, because these burns require months to heal.

David Walsh² discusses deep **tissue-traumatism** from Röntgen-ray exposure. He says there are many instances on record of injury to the superficial structures, such as the skin, hair, and conjunctivæ. It is generally assumed that no harm is done to the deeper structures. The author maintains that the Röntgen rays may exert a very harmful action upon some of the deeper tissues. Reed, of Dundee, experienced dermatitis and loss of hair after 4 exposures, the focus-tube being over the front of the body; and on the evening of the exposure there was not only erythema of the chest and belly, but redness of the back. This looks as if the rays had a selective action upon the deeper epidermis and dermis after passing through the body. Gilchrist has reported a case in which periostitis and osteitis developed as the result of X-ray traumatism. Walsh has seen the brain apparently affected by the X-rays, the patient suffering from giddiness, headache, vomiting, fever, and prostration. He has also seen gastric symptoms produced by them, such as pain, tenderness on pressure, flatulency, colic, and diarrhea, these symptoms being apparently due to inflammation of the gastrointestinal mucous membrane. We know that local tremors may be set up by exposure, and Thorne says that in several instances the heart has been affected. Despaigne and others relieve the pain of cancer by the rays. He reported that after the eightieth sitting the patient's skin became black. These results suggest an analogy with the sun's rays. Cutaneous rashes are common to both agencies. Pigmentation of the skin is common. In the case reported by Murray we have a mimicry of mild heat-apoplexy. There are 3 chief theories as to the cause: first, that the injury is caused by the X-rays or something that accompanies them; second, that the effect is due to ozone liberated in the surface-tissues; third, that the result is due to particles of platinum carried by the cathode rays. The author thinks that the traumatism is due to heat-rays; in other words, that it is a kind of burn.

¹ Phila. Med. Jour., Feb. 26, 1898.

² Brit. Med. Jour., July 31, 1897.

N. Stone Scott¹ makes a study of 69 **X-ray injuries** which arose in 20,000 applications. These include the 24 cases collected by Gilchrist, of Johns Hopkins University. The rays can certainly cause dermatitis and also depilation, but do so usually when the application is long or the tube has been closed, although in some cases there is an idiosyncrasy and the trouble develops after a short application with the tube some distance off. Scott maintains that even the most susceptible will not be affected in an hour's exposure if the tube is 10 in. away. In 6 of the reported cases deeper structures than the skin were involved, but Scott doubts whether this condition was really due to the X-ray.

L. Thomas has reported a case of **cystitis** as due to the X-rays, and Scott admits that they may have resulted from the irritation produced by the calculus in the bladder. There were 3 cases of periostitis reported, and in 2 of them the author believes that the complication was a mere coincidence. In regard to Gilchrist's case, he alleges that the skiagraph does not prove the existence of periostitis; that it was probably produced by unequal exposures; and if it was, must be inaccurate and lead to erroneous conclusions.

Albero-Schonberg² discusses the use of the Röntgen rays in the treatment of **lupus**, reporting 2 new cases. One case was a man of 20, with lupus of the face and nose, who was completely cured. The second case was a woman of 48, suffering from lupus of the face, who was cured after 6 months' treatment.

Arnozan and Bergonie³ employ the Röntgen rays for tracing the direction and the shape of **fistulous tracts**. A hollow tube was passed into the fistula, and into this tube a lead thread inserted, and the Röntgen rays enabled the length and course of the fistula to be made out thoroughly.

Roux and Balthazard⁴ have shown that a skiagraph can be taken of the **outlines of the stomach** if the patient previously eats bismuth mixed with food. The use of the fluoroscope will enable us to observe the contractions and movements of the stomach during digestion by this method.

Péan⁵ shows the great value of skiagraphy in detecting **foreign bodies in the esophagus**, the process not only locating the body, but enabling us to decide what operation is most desirable.

Beck⁶ has shown the use of the Röntgen rays in detecting **arteriosclerosis**, and his radiographs show the shadows of the radial and interosseous arteries on both sides, the arteries of the head and aorta not being visible. This confirmed what was found in the temporal and facial arteries during operation.

Buxbaum⁷ maintains that **gall-stones** can be discovered by the X-rays. The patient lies upon his face, the plate being placed under the abdomen and the tube over the back.

In the Clinical Society of London, Frederick Taylor and A. D. Fripp⁸ communicated a case in which **renal calculus** was detected by the X-rays and subsequently removed. President John Langton observed that the density of skiagraphs varies with the nature of the stone, being densest with oxalate of lime, less dense with uric acid, less dense still with phosphatic stones, and least of all with intestinal concretions and biliary calculi. He failed to obtain a skiagraph in a case of renal calculi. Mr. Makins operated upon a case in which there were 16 calculi, and yet the attempt to take a skiagraph failed. Barry Blacker stated that he had examined dozens of cases of supposed renal calculi, and in only 3 had the plate showed stone present.

¹ Am. X-ray Jour., Aug., 1897. ² Fortschr. d. Röntgen Strahlen, Band i., Heft 2 and 3.

³ Jour. de Méd. de Bordeaux, Nov. 21, 1897.

⁴ Deutsch. med. Woch., Apr. 7, 1898.

⁵ Dublin Jour. Med. Sci., Feb., 1898.

⁶ N. Y. Med. Jour., Jan. 22, 1898.

⁷ Southern Med. Rec., May, 1898.

⁸ Brit. Med. Jour., Apr. 30, 1898.

Charles A. Morton¹ reports a case in which a boy came into the hospital with well-marked symptoms of renal calculus, but these symptoms completely subsided with rest in bed. A skiagraph was then taken which exhibited a calculus, and this was successfully removed.

Arthur D. Bevan² discusses X-ray detection of stone in the kidney, and reports a case. Eight months ago he removed a large stone from the right kidney of a man. The man came back last October. An X-ray picture was taken, which showed a large stone in the left kidney, and this stone was removed. The writer states that it is difficult to detect small stones; and it is difficult to detect even large stones if the individual is fat. One must be familiar with X-ray work in order to properly interpret the skiagraph. Bevan says that although in a few cases the X-rays have been employed at the time of operation, he does not believe that under ordinary circumstances such a procedure is feasible. If it is employed, the kidney is brought out through the wound and the operator grasps the sterilized handle of the fluoroscope and examines the kidney to determine if stone is present, but under ordinary circumstances it is better to split up the kidney to make the examination.

E. Hurry Fenwick³ calls attention to the use of the Röntgen rays and the fluoroscope as a means of detecting small, deeply placed stones in the exposed kidney. He states that it is quite possible to overlook a stone even when we have carefully explored an exposed kidney. Opening the kidney is not free from danger; hemorrhage may ensue or subsequent inflammatory changes take place. He therefore thinks that when the kidney is brought out upon the back that the operator should inspect it with the fluoroscope, in order to determine if stone be present.

L. L. McArthur⁴ writes on the X-ray detection of stone in the kidney. In a patient in whom he had removed stone from the right kidney, symptoms of stone in the left kidney subsequently developed. Skiagraphs showed the stone, and it was removed successfully. This operation was done in February, 1897, and was the first one in which the concretion had been located by the X-rays.

T. A. Thyne⁵ reports a case in which he skiagraphed a renal calculus, and subsequently removed the stone by nephrolithotomy.

Skiagraphing the Arteries.—At a recent meeting of the Pathologic Society of Manchester, Raw⁶ explained to the society a method he had adopted for skiagraphing the arteries. He said that when trying to examine a fracture which was enveloped in a thin layer of plaster of Paris, he found plaster quite opaque to X-rays. The idea then occurred to him that the vessels (arteries) might be reproduced in the skiagraph by injecting them with a somewhat similar substance. Accordingly, when the next opportunity occurred, he injected postmortem a solution of calcium sulphate and carmine into the femoral artery and then took skiagraphs of different parts of the body. He illustrated his remarks by exhibiting several pictures showing the arteries perfectly, even to the most minute anastomoses. In fact, so opaque was the substance that the arteries actually showed through the bones. Raw also exhibited a 24 by 18 in. bromid print of a child, showing all the arteries of the body injected.

R. Bolton McCausland⁷ reports 2 unusual cases of **foreign body** recognized by the Röntgen rays. He tells us that in cases where we are dealing

¹ Lancet, June 4, 1898.

² Brit. Med. Jour., Oct. 16, 1897.

³ Austral. Med. Gaz., Oct. 20, 1897.

⁴ Chicago Med. Recorder, Mar., 1898.

⁵ Chicago Med. Recorder, Feb., 1898.

⁶ Med. Rec., July 17, 1897.

⁷ Brit. Med. Jour., May 7, 1898.

with a foreign body, it is essential to plan an incision so that the body can be removed with the least possible damage to the parts, to be able to say at what distance from the surface the body lies, and to be able to act rapidly. He reports a case of a needle in the forearm in which the fluoroscope showed the needle below the elbow-joint, in front of the radius. It could be distinctly felt. The next day the patient was brought down to be operated upon, and the needle could not be felt, so she was returned to the wards. A radiograph which was taken showed that the needle had shifted from its original position, and was in the line at the junction of the lower and middle thirds of the forearm. Some days later a fluoroscopic examination showed that the needle was midway between these two previously mentioned positions. While the fluoroscope was being used the line of the needle was drawn with a blue pencil on the skin of the forearm, back and front. An incision was made and the needle was easily removed. The author reports a second case. This patient was a woman who had fallen down stairs and hurt her knee. A foreign body could be felt, and the point of a needle was removed. After the wound had healed and she had been walking about she complained of a pain in the same leg to the lower and outer part of the patella. A radiograph was taken and a foreign substance was recognized. An incision was made and another pointed end of needle was removed, part evidently of a broken needle.

W. J. Collins¹ reports a case in which he removed a **bullet from the thigh** after 3 years lodgement, having detected it by the aid of the X-rays. He states that it is well to remember, by way of caution, a case in which he was assured by a radiographer that there was a needle in a boy's knee, and the boy himself alleged that there was. Collins opened the knee-joint and searched every nook of it, and found nothing. On submitting him again to radiographing the assurance was given that the needle had disappeared. Caution is certainly necessary in interpreting a skiagraph. In another case a radiographer stated that there was a large area of necrosis in the shaft of the femur. The symptoms, however, were positively against such a condition.

Frederick D. Bird² reports a case in which by skiagraphy he recognized a **bullet in the body of the axis vertebra**, and subsequently removed the projectile.

F. J. Clendinnen³ describes a method by which it is possible accurately to localize **foreign bodies** by the X-rays. He passes a needle beneath the epidermis, dissecting the point of entry of the foreign body, if known, or some other anatomic landmark, and parallel to another landmark, such as a line in the skin. The skiagram will show the relative position of this indicating-needle to the foreign body.

I. L. Gillanders⁴ records the case of a patient who had a **bullet in the hand**. The bullet was located with the X-rays and an operation was performed, but it was impossible to find it. He then decided to operate while the rays were actually passing through the tissues, substituting the fluoroscope for the sensitive plate. On introducing the bullet-forceps into the wound a shadow of the instrument was thrown upon the screen. The bullet was reached and readily removed. He tells us that the direct use of the screen is preferable in many cases to operating by the aid of a skiagraph, if the foreign body is fixed in the less dense tissues. It is advisable to place over the skin a piece of metallic foil or other opaque substance, indicating the line of proposed incision, before operating. A foreign body can be accurately localized by the cross-wires and by other plans; but all of these methods take time and involve complicated

¹ Lancet, Oct. 16, 1897.

³ Ibid., Apr. 20, 1898.

² Intercol. Med. Jour. Austral., May 20, 1898.

⁴ Brit. Med. Jour., May 14, 1898.

mathematic measurements. With good apparatus it ought to be possible to extract bullets and foreign substances from any part of the body by the direct use of the screen.

J. B. Fattie¹ records a case of **gunshot-wound of the brain** in which the skiagram distinctly showed the lodged bullet. The bullet was not removed, but the patient recovered.

Braatz² reports a case in which he recognized by means of the Röntgen rays a **bullet within the cranium** and near the base, where it had lodged for 2 years; he operated and successfully removed it.

Von Bergmann,³ after discussing **bullets in the brain** and the Röntgen rays, reports 2 cases which he examined in this way. In the first case the bullet had entered through the left upper eyelid, on the nasal side. The Röntgen ray showed the bullet to be lodged in the white matter of the occipital lobe. In the second case the bullet had entered through the right temporal region 3 years before. The Röntgen ray showed the bullet to be lodged at the anterior two-thirds and posterior third of the posterior portion of the internal capsule.

George A. Peters⁴ reports a case of **gunshot-wound of the spinal cord** in which the bullet was detected by the use of the X-rays.

Morizes⁵ locates the **position of foreign bodies** by X-rays in the following manner: The patient is placed between the Crookes tube and the fluorescing screen. An adhesive disc of lead is placed over the area where the foreign body is seen. Another is placed on the side toward the screen, on a direct line from the first disc and the foreign body, so that these two discs of lead and the foreign body cast together but one shadow. The patient is then turned, and the two other discs are applied in the same manner on another straight line through the foreign body, and the intersection of these two lines locates the foreign body with precision.

John Dennis⁶ describes the use of the **fluorometer** in Röntgen-ray work, which he maintains will enable us to produce a correct shadow on the field of the fluoroscope or upon the sensitive plate, and to reproduce exactly on the operating-table the position of the object. It gives an accurate cross-section of the foreign body, or of any desired part of the anatomy which is near it. It fixes with exactness the line of cross-section upon which any foreign substance is situated. It enables us to establish a second line at right-angles to the first, at the intersection of which 2 lines the foreign substance is located, and it gives us an undistorted view of the bones of the skeleton.

William S. Hedley and James Mackenzie Davidson⁷ describe a method for the **accurate localization of foreign bodies**. Upon the photographic plate 2 wires are placed at right-angles to each other. The Crookes tube is placed with its positive at an accurately measured distance from the plate, and it should be at a true perpendicular to the point of crossing of the wires. The wires are painted over with some sort of pigment, and the area to be photographed is placed on the plate and carries with it a mark of these cross-wires. The tube is then displaced to a measured distance one side of the perpendicular line and the exposure taken; then to the corresponding part on the other side of the perpendicular and another exposure taken; the negative shows the double images from the 2 different points of view. The negative is developed and fixed and washed, and at once placed on a horizontal stage illuminated

¹ Med. News, Aug. 28, 1897.

² Berlin. klin. Woch., May 2, 1898.

³ Presse méd., Feb. 12, 1898.

⁴ Centralbl. f. Chir., No. 1, 1898.

⁵ Brit. Med. Jour., Oct., 1897.

⁶ Buffalo Med. Jour., Apr., 1898.

⁷ Lancet, Oct. 16, 1897.

from below by a reflector, and it is so placed that if the perpendicular is dropped from the notch on the horizontal scale it will fall on the point where the shadows of the wires cross. On each side of it another notch is made at a distance at the exact distance and height that the anode of the Crookes tube occupies in the 2 exposures. A fine silk thread is passed through each notch and a piece of lead is attached to one end of each thread, while the other is passed through the eye of a fine needle. The needle is weighted with lead so that its eye lies flat on the surface of the negative. These 2 silk threads represent the paths of the X-rays, and if each needle be placed at a corresponding point in each shadow, it follows that the point where these threads cross marks the position occupied by the corresponding part of the foreign body, and its distance can be measured perpendicularly from 3 planes.

W. S. Hedley¹ recommends the use of the **stereoscope** in looking at radiographs, claiming that it enables us to recognize the true relations of objects and their truthful contour.

Dumstrey,² in writing upon the diagnostic utility of the Röntgen rays, shows that **unsuspected fractures** are frequently recognized by them, fractures which are thought to be dislocations or injuries of tendons or of joint-capsules, the process being particularly useful when the limb is swollen or painful. In fractures of the radius there is sometimes, also, a fracture of one of the carpal bones, or a splinter of bone breaks off from the radius or ulna and acts as a foreign body, and causes union to be remarkably slow. The process is useful in finding areas of tuberculosis in bone.

Tracy³ calls attention to the fact that there may be great **errors in the interpretation of skiagraphs**. Distortion of the image may result in taking the picture, this distortion varying with the distance of the tube and increasing with its nearness. It is also affected by the position of the part. These fallacies should always be recognized, but may possibly lead to errors of justice.

J. William White⁴ elaborately reviews the surgical application of the Röntgen rays, and in a complete and scholarly article sets forth all that workers have so far accomplished in this field.

GUNSHOT-WOUNDS.

Tavel,⁵ as the result of a series of experiments, concludes, as did La Garde, that if **virulent bacteria** are carried into the tissues by bullets they cause infection; and he maintains that it is impossible satisfactorily to disinfect the track of the bullet either by irrigation with antiseptic fluids or by cauterization. He was able to produce infection in animals by firing a bullet through infected material and by dressing a wound with some infected substance.

During the German Surgical Congress of 1897, Bruns, of Tübingen, discussed⁶ the use of the **Dumdum bullet** by the English in India. This bullet is made by filing off the hard casing at the point and leaving the lead core exposed. Bruns experimented with these bullets upon cadavers. He found that when such a projectile struck bone it splintered it dreadfully; and when it struck soft tissues it tore frightful gaps in them. He maintained that this bullet is inhuman, and should be forbidden in European warfare. The object in war should be to disable an enemy, but not to mutilate or kill him.

¹ Lancet, Mar. 5, 1898.

² Unfallheilk. Forts. d. Röntgen Strahlan, Band i., Heft 2, 1898.

³ Jour. Am. Med. Assoc., Nov. 6, 1897.

⁴ Am. Jour. Med. Sci., Jan., 1898.

⁵ Zeit. f. Chir., Band xlvii., Hefte 2 and 3, 1898.

⁶ Gaillard's Med. Jour., June, 1898.

Surgeon-Major-General J. B. Hamilton¹ discusses the evolution of the Dumdum bullet. He tells us that the conical bullet was introduced shortly before the Crimean war, and the first outcome of this evolution was the Minié bullet. This was followed by the Enfield muzzle-loading rifle, the bullet of the Enfield being conical, solid in front, with a hollow in the base, which causes the lead to expand and take the groove of the rifle. All of these bullets were solid, and caused much the same sort of wound as a spherical ball. With the introduction of the Snider rifle into the English army the bullet was changed; a hollow, filled with a plug of wood or clay, was introduced into the front part of the bullet, and the base was also hollowed and plugged, a diaphragm of solid lead being left in the center. This projectile was most deadly, the plug in front expanding the bullet on impact and causing terrible injuries to soft parts and bones. The next step was to form a hollow in the front, over which the lead was drawn, leaving a space filled with air. Then came a solid portion of lead and a base plugged with clay. The smashing powers of this bullet were dreadful, and it was largely adopted for sporting-purposes. This form of Snider bullet was called nonexplosive, but it was really explosive on impact. Two forms of genuine explosive bullets were used by sportsmen: one, a bullet with a cavity in the apex; the other cast in two parts and swaged together in a machine. In the first form the cavity was filled with detonating powder and closed with beeswax; such a bullet would naturally burst after it had entered some distance into the body of the animal. It usually inflicted dreadful wounds; but occasionally it failed to explode or burst on impact, causing an extensive skin-wound, but little deep damage. The second form was a most terrible projectile. This bullet was cast in two parts, the base resembling a thimble with a flat top; the apex was conical, with a hollow leading down to the point. The base was nearly filled with ordinary powder, and then a piece of cloth was laid over the top, the apex was fitted in, and the two parts were swaged together in a machine. In the hollow leading down from the point detonating powder was poured and the hole closed with wax. This was a typical and deadly form of explosive bullet, and it was against it and like inventions that the Geneva Convention protested. The next advance was the Martini-Henry rifle, with a hardened projectile, with smaller diameter, increased velocity and penetration, and a lower trajectory. It was complained of this bullet that it did not have stopping power, and that it would pass through the limbs or body without causing immediate collapse, unless it struck a vital part or an important bone. This was not an objection in European warfare, as civilized man is more susceptible of injury than savages. The Martini-Henry was superseded by the Lee-Metford, the present military rifle of England. The bore is $\frac{3}{40}$ in. The bullet is of lead surrounded with a jacket of nickel, and is fired with smokeless powder. A very high velocity and great penetration are obtained with a very low trajectory. It was found that this weapon was deficient in stopping power in warfare among savages, and that a wounded man might still be able to charge and inflict injury. Some experiments were made at the Dumdum ordnance-factory, near Calcutta, and it was found that by leaving a portion of the lead at the apex of the projectile uncovered the bullet would mushroom soon after impact and inflict a wound that would stop the most determined Ghazi. Such projectiles were made by removing a portion of the envelope, or by putting a wrapper of nickel as far up the bullet as would enable it to take the rifling, leaving the lead bare at the conical portion.

Surgeon-Colonel W. F. Stevenson² writes on the effect of the Dumdum

¹ Brit. Med. Jour., May 14, 1898.

² Ibid., May 21, 1898.

bullet from the surgical point of view. He maintains that the effects of this projectile have been exaggerated. The idea regarding the damage produced by this missile is the result of reports from India, which were grounded on experiments made by shooting it through animals, whose tissues are of greater resisting power than man's; and other things being equal, the greater the resistance the greater will be the damage. He maintains that the Dumdum bullet is more humane than the Snider or even the Martini-Henry. The object attained by leaving the point of the bullet uncovered was to increase its stopping power on traversing soft parts only; but it does not often break up without contact with bone; and if it does not break up, the wounds it produces in soft parts are exactly similar to those of the Lee-Metford and Lebel bullets. When it does break up it causes an extensive lacerated wound of the soft parts, but one which is not so severe as those which result from the ordinary small bore of any of the older rifles when the projectile meets bone in its passage. The fractures of the shafts of the long bones and their cancellous heads resulting from the Dumdum bullet are comparable with those produced by the Lee-Metford, and are no more difficult to cure than the latter, notwithstanding the fact that particles of the core and envelope are likely to remain in the tissues. The Snider bullet was the most destructive bullet ever employed. Stevenson has made experiments with Dumdum bullets and has seen men hit with them on the Indian frontier, and is convinced there is an exaggerated notion of their destructive action. They often pass through the soft parts without changing their shape or breaking. That the Dumdum bullet when it breaks up produces a more lacerated track through soft parts is no doubt true; for it was found that the stopping power of the Lee-Metford is *nil* when bone is not implicated, and something had to be done to render a small-bore rifle effective against Asiatic fanatics, but fractures caused by it are no more severe or dangerous. It was in reference to fractures that Bruns maintained that the Dumdum bullet was brutally inhuman; but, as a matter of fact, its employment in warfare is no more inhuman than is the employment of any of the small-bore weapons. In regard to these small-bore weapons Bruns has stated that they are humane and lessen the horrors of war.

Charles E. Woodruff¹ writes on the causes of the explosive effect of **modern small-caliber bullets**. He shows the conflicting nature of the views that are entertained as to the destructive effects of these bullets. Some reports show fearful explosive action and mutilation within certain ranges; others would indicate that the bullet inflicts little damage. Woodruff maintains that explosive effects are due to vibrations and wave-motions set up in the tissues. A rapidly revolving bullet causes vibrations in the air in tissue with which it comes in contact, and the vibrations—for instance, in the bone—may be sufficient to shatter it if the bullet strike the bone at one end; but if the bullet strikes at the center of percussion—that is, at the point where a blow causes no vibration—then a small hole may be bored through the bone. In the case of a cavity containing fluid or semifluid contents, the fluid is incompressible, and in front of the bullet there is produced a wave which imparts great centrifugal velocity to the particles, and this centrifugal movement may pass outward, and may even burst the walls of the vessel or viscus. The particles running toward the periphery cause a vacuum behind the bullet, and there is a return-wave, which often causes collapse of the walls of the cavity after it has been overdistended. In such an organ as the brain these movements may take place several times to and fro, completely disorganizing it. In such a case, as the bullet emerges the edges of the wound of exit are lacerated in all

¹ N. Y. Med. Jour., Apr. 30, 1898.

directions as by a bursting force. The author maintains that experiments on cadavers produce uncertain ideas as to the action of bullets on tissue. He says the ideal bullet will disable everyone struck, but kill very few; but the new bullet has little stopping power unless explosive action is manifested.

Henry J. Davis¹ gives an interesting and instructive review of the **gun-shot-injuries** met with in the late Greco-Turkish war, with remarks on **modern projectiles**. He approves of Sir William MacCormac's definition of a bullet-wound as "an extreme form of contused wound combined with the dangerous depths of a punctured wound." He discusses modern bullets and the effects which they produce. He tells us that the Greeks used the La Gras French rifle; the Turks used chiefly the Martini-Henry, but some brigades were armed with the Mauser. The Martini bullets not unusually lodged. He never found a single Mauser lodged. A great many men were perforated by Mauser bullets and not completely incapacitated. The Mauser bullet perforates the part struck, including perhaps the bone, and does little damage compared with the Martini, which, if it strikes bone, fissures and splinters it in all directions. The author describes some shell-wounds that he met with, and discusses in detail the characters of the bullet-wounds. He was surprised at the comparatively little damage done by rifle-bullets. In some few cases it was enormous; but in the majority the ball passed directly through the parts struck, leaving a minute bluish-black hole at each end, resembling a magnified leech-bite of about 3 days' standing. In most of the cases it was impossible to tell by the appearance of the wounds which was the wound of entry and which that of exit. In some of the cases the edges of the wound of entry were inverted, but not in all. In some, especially in oblique wounds, the edges were round and gaping. In many cases the wound of exit resembled the wound of entrance, although in some few instances the edges were inverted. The wound is nearly always smaller than the bullet producing it. He asked nearly every wounded man whether he was knocked over when struck, and such a result seemed to have been invariably the case. When hit a man experiences the sensation of a sudden heavy blow. If wounded in the head, trunk, or lower limbs he does not fall forward, as one sees on the stage, but collapses, sinks to the ground, turns pale, sweats, and often vomits. All this may be due to mental shock. The Lee-Metford and other modern bullets have so high a velocity that at close quarters pieces of cloth, etc., are not carried before the bullet into the tissues. Hence infective processes are much rarer than formerly. It is often very difficult to tell if a fracture exists, because there is not a complete solution of bony continuity and there is very little displacement. Wounds of the upper extremities heal much more rapidly than wounds of the lower extremities. Unless a fracture is of the key-hole form there is nearly always comminution; but little fragments do not always necrose. They often serve as scaffolding for granulations to grow on and ossify. The heat produced by a bullet striking a bone is great, and may add to the injury. A bullet-wound of a large joint, like that of the knee, does not always suppurate. If a man is struck obliquely by a bullet a simple contusion may result; there may also be a subcutaneous fracture, and the ball may run parallel to the surface, grooving it. Such injuries may be termed furrowed wounds. A ball fired obliquely may burrow for some distance just under or a short distance beneath the skin and then emerge, forming a so-called seton-wound. Sometimes a ball enters the tissues and falls out. A bullet may perforate a portion of the body struck and emerge almost unchanged, or it may undergo comminution itself without fracturing a bone. In speaking of chest-injuries he tells of one man who was shot, and

¹ Brit. Med. Jour., Dec. 18, 1897.

the X-rays discovered a Mauser bullet in the lung. Pneumonia, pleurisy, hemorrhage into the pleura, and empyema resulted. The chest was aspirated and then a portion of rib was excised. This man recovered and the ball doubtless became encysted. In another case a bullet perforated the pleura, the lung, and the diaphragm, and injured the liver, and yet this man recovered. Pelvic wounds are very serious. He reports the case of a man who was shot through the abdomen and had signs of internal hemorrhage. The abdomen was opened and clots removed, but no injury to the intestine could be found. The patient made a rapid recovery. This was the only laparotomy on a Greek subject during the war. Most of those performed among the Turks were fatal.

Georg Perthes¹ reports a case of **pistol-shot-wound of the pulmonary artery and aorta**. The man had attempted suicide by shooting himself, and 3 hours later he was brought into the hospital in shock, suffering from dyspnea and bloody expectoration. The bullet had entered the second interspace, a little to the left of the sternum. Around this opening pulsation was detectable, the intercostal space becoming prominent at each heart-beat, the fourth and fifth spaces being retracted at the same time. There was a thrill over the pulsating area, and below the wound in front there was dullness on percussion. Over the anterior portion of the left chest there was a distinct blowing-murmur, which was limited to neither systole nor diastole, and which could be detected in the carotids, especially in the left. The patient improved rapidly and his dyspnea passed away, although the pulse continued to be very rapid. The X-ray showed that the bullet was lodged in the sixth dorsal vertebra. Diagnosis was made of injury of a large blood-vessel. At the time the patient shot himself he had a fistula of the left side, resulting from an Estlander's operation, and one effect of the injury was to start up the empyema again. Two months after he came into the hospital the third and eighth ribs were removed, and the patient got much better and was around out of bed for several months. Ten months after the attempt at suicide he died, and the autopsy showed that the left lung was retracted because of the empyema, the vessels being thus uncovered. The bullet had passed through the upper portion of the left pulmonary artery, perforated the descending aorta, and lodged in front of the sixth dorsal vertebra. An aneurysm had formed between the 2 vessels. The reason that the aneurysm had not been fatal was that thick adhesions surrounded the vessels and the blood found a channel to flow into the pulmonary artery. The death was due to thrombi having broken off from within the aneurysm and caused edema of the lungs. The author has collected 12 cases of injuries of the aorta which were not followed by instant death.

Ruotte² reports a case of **gunshot-wound of the abdomen** of a boy of 12, in which the treatment was purely expectant and the patient recovered. Expectant treatment was pursued because there was no skilled help; the patient's surroundings forbade any other plan, and the parents refused to permit him to go to a hospital. The patient had been shot, at a distance of a few inches, with a gun loaded with large shot. The wound was below and external to the umbilicus. The intestine had unquestionably been wounded. Gas and greenish fluid escaped from the wound after the third day. Ice was applied to the abdomen, opium was occasionally given, and a limited fluid diet was administered. The boy was able to go to school within a month of the accident. The author does not cite this case to prove that surgical intervention is not proper

¹ From *Beiträge f. klin. Chir.*, Band xix., Heft 2. Abstracted in *Ann. of Surg.*, Jan. 1898, by C. L. Gibson.

² *Arch. provinciale de Chir.*, Oct., 1897.

in abdominal injuries. He believes that it is proper if we can obtain the conditions which are necessary for success.

Paul Ziegler¹ writes on the treatment of **perforated, punctured, and gunshot-wounds of the abdomen.** He tells us that in the majority of cases it is impossible to tell from symptoms whether or not perforation has taken place. Hence immediate operation is the best and wisest course to pursue; this is the rule which is followed in the University of Munich. They treated 7 gunshot-wounds, with a mortality of 58%, and 22 stab-wounds, with a mortality of 18.1%. These figures may be contrasted with a series of 30 cases treated by conservative methods between 1876 and 1890, the mortality having been 46.6%. The abdominal cavity should be opened by a median incision. All necessary manipulations should be performed with great rapidity. We should not perform complete resection, but should rather close a wound by simple invagination. If hemorrhage is extensive and hard to reach we must eviscerate. Hemorrhage from wound of the liver or spleen is better controlled by suture than by tampon. If the diaphragm is injured, open the abdomen and make a cut parallel to the border of the ribs, as this will enable us to examine the gut carefully and suture any other existing wounds.

F. W. Robinson² speaks of the use of decalcified bone in the **treatment of wounds.** This method was suggested to him by the old method of sponge-grafting. The author says that in the ordinary method of healing by granulation it is found that the power of absorption is to a great extent lost; therefore, theoretically the best thing to do is to dress with an animal material which is absorbable. He has employed decalcified bone in the treatment of granulating wounds. He takes the cancellous portion of the bone of an ox, removes the fat, decalcifying and preserving the bone in a 1:20 solution of carbolic acid. The bone is soft, porous, and pliable. He has met with much success by employing this treatment in fistula and callous ulcers: it never produces irritation; it causes the granulations to become healthy; the discharges from the wound diminish, and the bone is gradually absorbed. If the wound is unhealthy and is secreting pus freely, the bone is rapidly absorbed and has to be changed, it may be, daily; but in more healthy wounds it has to be changed only every fourth or fifth day. In treating an ulcer he cuts a piece of bone to about fit the ulcer, filling any deficiencies with minute pieces. In a very superficial ulcer he covers it with minute grafts of decalcified bone. In a fistula he takes small pieces of bone and pushes them down until the track is filled.

C. Phisalix³ claims to have discovered a **chemical vaccine for viper's venom.** The article is tyrosin, which is found in certain plants, especially the dahlia. He claims that this material will make a guinea-pig immune to the venom for 25 days. It is useless if injected at the time of the bite and has no value as an antidote, but is simply a chemical vaccine.

A. Ernest Gallant⁴ reports favorably upon the use of a mixture of castor oil and balsam of Peru as a **surgical dressing.** This mixture consists of ℥ xxx of balsam of Peru to 1 oz. of castor oil, and it has been used for granulating wounds, burns and scalds, abrasions, chemical burns, recent wounds, abscesses, boils, phlegmons, carbuncles, anthrax, ulcers, actinomycosis, gangrene, perforating ulcer, etc. (69,364 patients). This dressing, it is stated, does not prevent suppuration; but it keeps the gauze moist, and thus drains the wound and keeps it clean.

¹ Münch. med. Woch., Mar. 8, 1898.

² Presse méd., Feb. 12, 1898.

³ Lancet, Oct. 2, 1897.

⁴ Ann. of Surg., Sept., 1897.

OBSTETRICS.

By BARTON COOKE HIRST, M. D., AND W. A. NEWMAN
DORLAND, M. D.,

OF PHILADELPHIA.

The Work of the Year.—Undoubtedly the most striking feature of the year has been the great impetus that has been noted in the microscopy of obstetrics, especially in the field of fetal pathology and the pathology of the fetal appendages. We are thus becoming better acquainted with the occult problems that have for so long bothered the scientific obstetrician, such as the true nature of malignant deciduoma, the origin and function of placental tissue, the phenomena and nature of menstruation, and the intimate relationship that exists between the female generative organs and the other organs of the body. Organotherapy in osteomalacia, puerperal sepsis, and other conditions is still attracting considerable attention, and there has been the usual degree of advancement in the various technics of the obstetric operations. Apart from the foregoing there is but little new worthy of special mention.

PRELIMINARY AND GENERAL CONSIDERATIONS.

Midwives.—H. J. Garrigues¹ recalls a bill which was introduced in the New York State Legislature in 1884, for the regulation of midwives, but which was killed in the New York County Medical Society. The bill in question proposed the establishment of a school of midwifery in connection with a maternity-hospital, where the pupils would receive instruction in anatomy, physiology, and obstetrics under the best professors, and, before being graduated, be obliged to attend cases of obstetrics under the supervision of competent physicians, and then receive instruction in asepsis, antiseptic, and hygiene. It was intended that this school should be entirely under the control of medical men. The board of managers (medical men) were to appoint the professors and to have general supervision of the school and hospital. Since this bill was killed no further measures have been taken toward the regulation of this truly serious matter. In speaking of the dangers that follow the practices of midwives, Garrigues remarks that obstetric work presents certain peculiarities which make it preeminently objectionable to tolerate its performance by half-taught or entirely ignorant persons. In obstetrics every case involves the fate of at least 2 individuals. Aseptic midwifery is synonymous with good midwifery, and, likewise, septic midwifery with bad midwifery; and yet in private practice the mortality from puerperal sepsis is twice as large as in maternity-hospitals. This sad result is largely due to the employment of midwives. The average midwife is entirely incapable of foreseeing complications. Midwives also not only do harm through their lack of obstetric

¹ Med. News, Feb. 19, 1898.

knowledge, but they are most inveterate quacks. Their scarcely veiled advertisements in the newspapers show them to be willing abortionists, and since they have the right to give certificates of stillbirth, who knows whether or not an infant's death is a natural one? Although an evil, midwives are, however, in most countries a necessity, in view of the fact that physicians would be unable to find time to do the work. [In this respect we entirely disagree with the learned professor. There are many men who should be and are willing to devote themselves to pure obstetric work, and such should be encouraged, to the detriment of the midwife.] Garrigues finally offers the following resolution: Whereas, midwifery, or obstetrics, is an important branch of medical science and art; Whereas, midwives are not recognized by the State; Whereas, Section 153 of the Laws of New York, 1893, Chapter 661, amended in 1895, prescribes penalties for any person who, "without being then lawfully authorized to practise medicine within this State and so registered according to law . . . shall assume or advertise any title which shall show or tend to show that the person assuming or advertising the same is a practitioner of any of the branches of medicine;" Whereas, midwives by their ignorance and lack of cleanliness do great harm to parturient and lying-in women, and assume to administer potent drugs to them without the advice of a physician, and often treat sick women and children, and frequently are guilty of causing abortions; *Resolved*, That the Section on Obstetrics and Gynecology strongly recommends the taking of immediate steps to secure the passage of a law providing for the supervision of all persons, not legally qualified physicians, now engaged in practising midwifery, and debarring from such practice all persons not proved to be competent and qualified; and also containing such provisions as, without conflicting with existing rights, shall tend to confine the practice of midwifery to qualified medical practitioners.

Why the Birth-rate is Falling.—An editorial¹ remarks as follows: To-day the civilized world is confronted by a rapid decrease in the birth-rate, and in France the matter has reached sufficient importance to receive legislative consideration. In 1894 the birth-rate of France was 22 in every 1000 inhabitants, *the lowest rate of any country in the world!* To mitigate this evil French legislators are planning to exempt families containing 3 or more children from taxation, and to impose additional taxes on those who have less. What effect this will have on the decrease in the annual birth-rate remains to be seen. In the United States, while our present birth-rate is somewhat larger than that of France, Billings's statistics showing it to be 26.69 to every 1000 in 1890, we yet have much cause for apprehension, for our births each year are decreasing much faster than those of France. In 1894 statistics showed that the birth-rate of France had decreased 2.7 per 1000 in the previous decade; while Billings's statistics in 1890 showed that the birth-rate in the United States had decreased 4.27 per 1000 since 1880! At the same ratio of decrease our birth-rate at present must be about 23.69, *less than 2 per 1000 more than the rate which has startled France!* The fact that since 1880 our birth-rate has dropped from 30.95 to 23.69 in every 1000 people, ought to give rise to some thought as to the probable cause. Many factors have undoubtedly united in causing this terrible falling off in the annual birth-rate, but only two are of immediate interest to medical men. The first and most potent of these causes is unquestionably abortion, criminal or otherwise. A decade ago the estimated proportion of abortions was about 1 to every 12 or 14 pregnancies. To-day the best of authorities tell us that 1 out of every 5 pregnancies terminates in abortion, and between 80% and 90% of childbearing women abort once or more

¹ Am. Medico-Surg. Bull., July 10, 1897.

during their lives! The rapid increase in the frequency of abortions in a period of about 10 years, and a notable decrease of the birth-rate during the same period, are more than coincidences. Another fact, viewed from the standpoint of a decreasing birth-rate in France, which cannot fail to interest the medical profession, is that over 500,000 French women have had their ovaries removed since 1883! How much effect ovariectomy has had on the birth-rate no one knows; but the removal of 500,000 women from a nation by pestilence or famine in a space of a little over 10 years would scarcely tend to increase the birth-rate.

Women's Labor and Infant-mortality.—In dealing with the question of infant-mortality as affected by factory-labor, Collet¹ pointed out that the census-volumes do not contain any figures upon which trustworthy conclusions can be based, the returns of the employment of married women not being given. She endeavors, however, to arrive approximately at this information by the use of extraneous data, and her conclusions are worthy of careful study. One of the tables given shows the infant mortality-rate for the 5 years 1889-93, in 27 urban districts, grouped according to the percentage of the female population above 10 years of age returned as "occupied" in 1891. The towns are classified into 9 groups, according to the percentage of women workers—from 60% and upward to 25% and under; and it is pointed out that there is "a kind of correspondence between employment of women and girls and infant-mortality."

In considering the value of the figures as used for such a purpose it must, however, be remembered that it is necessary to take account of the important bearing which the constitution of the population, as regards prosperity and health-conditions, has as a factor in determining the causes of infant death-rates. The fact that, apart from the question of women's labor, the infant-mortality in artisan- as compared with residential towns may differ to the extent of over 100%, indicates how important it is in all such inquiries to select districts the general characteristics of which admit as nearly as possible of comparison. This has not been done in the case of the table in question. Brighton, for example, is classed with Manchester, Huddersfield, Birmingham, etc., simply because the percentage of occupied females corresponds in these towns. Although there are between 40% to 45% of occupied females over 10 years old in Brighton, it is more than doubtful whether the nature of their employment is such as appreciably to influence the infant-mortality. The fact is that women's labor in all probability has little influence upon infant-mortality. It is the employment of young married women in occupations necessitating their leaving their homes during the day which must operate fatally on child-life. For this reason, also, it does not follow that even artisan-towns in which women are largely engaged in factory-labor should be classified for this purpose with towns in which married women are employed. There are towns in which, although large numbers of single women are employed in factories, practically no married women are so employed.

Collet gives another table in which towns are grouped on the basis of the proportion of females above 10 years returned as in-door servants. It shows that the infant-mortality is in inverse ratio to the percentage of females so employed. This table is, of course, of value only as showing the infant-mortality in well-to-do as compared with poor towns.

In another table an attempt is made to arrive at a classification on the basis of the number of married women workers by a process, adopted in the Labor Department Report, of comparing the excess of occupied women over

¹ Brit. Med. Jour., Apr. 9, 1898.

married women. This is an ingenious method; but again, unfortunately, in its application regard has not been paid to the important consideration of the constitution of the populations selected for comparison. Residential districts are grouped with artisan-districts, and the preponderating influence of unequal social condition which is thus introduced must largely obliterate the lesser influence of married women's employment.

Collet, while admitting that the employment of married women in factories must contribute toward infant-mortality, does not seem to attribute to that influence such material consequences in that direction as some others who have specially studied the subject. Some years ago Reid called attention to the excessive mortality in the pottery-towns of North Staffordshire compared with the artisan-towns in the south of that county, where iron-working is the chief industry. In both cases large artisan-populations are grouped together in a series of towns which are practically identical as regards sanitary surroundings.

Although the infant-mortality is high in both groups of towns, those in the north of the county, where many married women are engaged in the potting industry, have an infant-mortality which exceeds that of the southern towns, where there are practically no married women workers, to the extent of no less than 30%. In this case the groups of towns compared are practically identical as regards prosperity and other conditions which influence the infant death-rate, and the only explanation of the extraordinary difference between the rate in the northern and the southern towns appears to be the factor of married women's employment away from home.

The Relationship between Pregnancy and the Development of Ovarian Tumors.—J. Williams¹ considers some important questions. He remarks that it has been asserted that pregnancy frequently gives rise to ovarian tumors. To prove this statement is, in the present state of our knowledge of the causes of tumor, not possible, even in the most favorable circumstances, when the state of the ovary has been investigated before the occurrence of conception, and again in the course of pregnancy and labor; nor can the negative of the statement be proved, except in cases in which the ovary was known to be the seat of tumor before conception took place, for under these circumstances it is evident that gestation could not have been the cause of the tumor complicating it. He answers in the negative the question, Does ovarian tumor occur with greater frequency in women who are or have been pregnant than it does in women who are not and have never been pregnant. From a study of 1000 cases of ovarian tumor operated upon by Spencer Wells, it is seen that between the ages of 20 and 25 years ovarian tumor occurs in the single rather more than three times as frequently as it occurs in the married; while between the ages of 25 and 35 it occurs with almost equal frequency in the 2 classes. After 35 years of age the proportion is reversed, and the disease is met with twice as frequently in the married as it is in the single—between 45 and 55, two-and-a-half times as often; between 55 and 65, nearly three times as often; but in those above 65 years of age it is found with almost equal frequency in each class. Looking at these figures alone, it would appear that pregnancy is a potent factor in the causation of ovarian tumors; for from 35 to 65 years of age, when marriage may be considered to have exercised its full effects, the married contribute a far greater number of ovarian tumors than do the single. Such a conclusion is, however, quite erroneous. This apparent result of marriage arises from the change which takes place in the social condition of the population, and the consequent alteration in the number of the married and the single, the number of the married undergoing rapid increase at the expense of

¹ Brit. Med. Jour., July 10, 1897.

the single. In the series of Spencer Wells we find between the ages of 20 and 25 years 23 married and 80 single women, or a proportion of rather more than 1 married to 4 single; while according to the Registrar-General's Report for 1891 the proportion of married to single women in the total population at this period of life is 30 to 70, or 1 to 2.33—that is, speaking in proportion, 1 married woman produces 1 ovarian tumor, while 2.33 single women produce 4, or 3 married women grow 3 tumors while 7 single women grow 12. Did ovarian tumors occur with equal frequency in the married and in the single between the ages of 20 and 25 years, the number in Wells's series would not be 23 married and 80 single, but 34 married and 80 single. The proportion between the number of married and of the single in the general population is as 87 to 12, or more than seven times as many; and yet, instead of producing seven times as many tumors, the married furnish us with only twice as many as the single. Williams goes on to say that if pregnancy were a cause of ovarian tumor it should be expected that with each successive pregnancy the liability would increase. Looking for an answer to this question in the cases which he had collected, he found, in the first place, that of the 228 cases in which the number of the pregnancy was noted, 87 were primiparæ. Not only do primiparæ form so large a proportion of the total number of cases, but ovarian tumor with pregnancy became, on the whole, rarer with each successive pregnancy, for among the cases there were in the second pregnancy 30 instances only; in the third, 21 instances; in the fourth, 14; in the fifth, 15; in the sixth, 9; in the seventh, 11; in the eighth, 4; in the ninth, 7; in the tenth, 1; in the eleventh, 2; in the twelfth, fifteenth, and nineteenth, each 1, and other multiparæ 26 instances. As to whether pregnancy favors the growth of ovarian tumor, Williams said this question must be considered under two heads: (1) Does the process of gestation itself give an impulse to the growth of the tumor? and (2) Does the tumor grow more rapidly after labor and during the lying-in period? With regard to the first point, in the notes of most of the cases which he had collected nothing was said about the growth of the tumor; but from certain statements it may fairly be inferred that the increase in it, if any, was slow. He judged that all tumors which, at the time of delivery, were situated entirely in Douglas's pouch or in the pelvis, by reason of their size, and all tumors smaller than the fetal head, could not have grown rapidly or at a rate unusual apart from pregnancy. As to the rate of growth, he considered that such tumors as required tapping more than once in the course of pregnancy increased at a quick rate. The whole of the evidence and the small number of the cases in which the growth of the tumor was rapid, appeared to show that pregnancy exercised no influence in accelerating the growth of ovarian tumors.

THE PHYSIOLOGY OF PREGNANCY.

The Toxicity of the Urine in the Last Month of Pregnancy.—

Among the many interesting contributions to this intricate subject is the paper by Stewart,¹ describing a series of experiments upon animals. His method consisted in selecting at random from patients in the last month of pregnancy urine, which was carefully kept in sterile jars; it was concentrated by boiling, neutralized with sodium bicarbonate, and filtered. It was then injected under careful antiseptic precautions into the abdomens of rabbits. In most cases death followed the injection, preceded by clonic and tonic spasms. The coefficient of toxicity by this method was fixed at 24 c.c. to the pound of animal. A comparison was made with these experiments by taking urine from

¹ Am. Jour. Obst., Aug., 1897.

nonpregnant gouty women, and also from a young girl not pregnant, and, so far as known, perfectly sound. The same result followed the injections in these cases. Stewart is led to conclude that there is no especial toxicity in the urine of women in the last month of pregnancy. [It would be interesting to compare these experiments with those made by injecting concentrated solutions of potassium salts in like manner. It is quite possible that the process of boiling developed irritating compounds, not normally in the urine, capable of producing convulsions and death. There remains still further to be remembered that it is not the contents of the urine in the last months of pregnancy which produce eclampsia, but the toxic substances which are not eliminated, and therefore are not present in the urine, but remain stored up in the liver and circulate in the blood of the eclamptic patient. As has been recently shown, the same poison which produces eclampsia tends to cause thrombosis and embolism, which also follow the circulation in the blood of compounds formed by the cell-necrosis present in various disordered conditions. It is not the eliminated poisons of the body which cause eclampsia, and the source of the convulsions probably does not reach the urine at all. The examination of the urine is simply the reading of a gauge to determine the condition of the mechanism within the body. The urine is but an index of the patient's elimination.]

The So-called "Decidual Cells" of Pregnancy.—According to Wiener,¹ the so-called "decidual cells" are not diagnostic of gestation. He has found that they occur in some forms of endometritis, in membranous dysmenorrhea, and in other conditions. Therefore the diagnosis of gestation based upon the presence of decidual cells cannot be considered positive. Spindle-shaped cells are found in other conditions than sarcoma—*e. g.*, certain forms of endometritis; therefore, sarcoma of the uterus does not exist in every instance in which this cell is present. This is most frequently associated with chronic glandular endometritis—that is, where the glandular epithelium and interstitial structures are hypertrophied and hemorrhages into the connective tissue occur. The mucous membrane becomes soft and considerably thickened. In the glandular atrophy following interstitial endometritis the interstitial cells force their way between the epithelial cells, leaving a connective-tissue structure abounding in spindle-shaped cells, with an occasional area of leukocytes.

The Menstruation and Ovulation of Monkeys and of the Human Female.—W. Heape,² in speaking of *menstruation*, describes the histologic process of menstruation in *Macacus rhesus* as identical with that already described for *Semnopithecus entellus*—namely, a growth of stroma and increase of vessels, a breaking down of congested vessels and consequent formation of lacunæ, a degeneration of the superficial mucosa and rupture of lacunæ, and a denudation of the superficial portion of the mucosa, with consequent formation of a menstrual clot—the only difference of moment being that in *Macacus rhesus* the mucosa is thicker, the protoplasmic network is denser, and the glands are more numerous and more branched than in *Semnopithecus entellus*. Sections of human and monkeys' uteri were shown to demonstrate these points; and Heape was led to infer that in all probability the menstrual process is practically identical in women and in female monkeys. He points out that although monkeys menstruate all the year round, they breed only at certain times of the year, and thus occupy an intermediate position between the lower mammals and the higher primates. He expresses the opinion that the histologic homology of "heat" and menstruation would be established.

¹ New Orl. M. and S. Jour., May, 1898.

² Brit. Med. Jour., Apr. 16, 1898.

With regard to the relation between ovulation and menstruation two divergent views were quoted, the one that ovulation occurs at each menstrual period and that the 2 processes are due to the same active cause; the other, that ovulation and menstruation are independent of each other, that they are due to independent stimuli, and are coincident only by accident. Out of 59 adult menstruating female monkeys only 1 was found with a recently discharged Graafian follicle. Heape summarizes his observations by stating that in women and female monkeys (1) ovulation and menstruation are not necessarily coincident; (2) menstruation may take place without ovulation; and in women (3) ovulation may occur without menstruation. Heape combats the views that in the lower animals "heat" is brought about by ovulation, and that the ovary is the seat of the stimulus which induces heat; he urges that both menstruation and ovulation are closely connected with, and largely influenced by, congestion, and that in the primitive condition they were both due to the same cause. In the discussion, Horrocks said that in women there is incontestable evidence that ovulation occurs without menstruation, for it is a well-known fact that a woman may conceive without menstruating. Girls in India not infrequently conceive before menstruation begins, and women during the amenorrhea associated with lactation occasionally conceive without menstruating. He did not, however, know any facts which prove that menstruation can take place without ovulation. It is well known that when the ovaries are removed, or if they become wholly degenerated, or if they cease their function, then menstruation ceases. He could not help feeling that menstruation in women and rut in animals are not the same thing. Herman thought that Heape's valuable paper shows how very imperfect our knowledge is of the physiologic changes that go on in the ovary. He still thinks that menstruation depends, if not upon ovulation, yet upon some ovarian function; he bases this opinion upon the broad clinical facts that when the ovaries are absent or ill-developed menstruation is never present, and that when both ovaries are removed menstruation always stops.

The Origin of the Placenta.—A. H. F. Barbour¹ read a paper on Leopold's account of the origin of the placenta, in which he stated that Leopold's *Atlas, Uterus und Kind*, is the most important contribution made to the sectional anatomy of obstetrics during the past year, and by far the most important yet made to the anatomy of pregnancy as distinct from the anatomy of labor. It gives sections of the pregnant uterus from the first week up to full time. The most valuable is that of the uterus and ovum at the end of the first week. It is the only one known at this early date. Its history was that of a multipara of 30 years, who was operated on for cancer 10 days after the cessation of menstruation. Intercourse had taken place 9 days before operation. A congested mucosa and a slight elevation the size of a lentil-seed on the posterior wall near the fundus were found. The mucosa increased to double its thickness as it came near the ovum, diminishing again by one-half beneath it. The appearance thus was that of a stone set in a ring. There were a compact and a spongy layer; the former showing the drawn-out necks of the glands, the latter their convoluted bases. The new point brought out is that these changes are present as early as the first week of pregnancy. This shows how rapid is the growth of the mucosa. The reflexa was thick below, but thinned toward the upper pole of the ovum. Glands with epithelium were present at its lower part, but as it thinned its structure became indistinct. The chorion was closely blended with it; and while cells were here and there seen of a decidual character, it was chiefly composed of fibrin. Villi were seen cut in various direc-

¹ Brit. Med. Jour., Dec. 25, 1897.

tions within the reflexa. They had a single layer of epithelium, and vessels were beginning to form in their stroma. A young villus appeared as a wart of epithelium. The ovum rested within the reflexa on a fold of mucosa, like a ship resting on a ridge of rock. There was no epithelium on the top of the ridge, though there was on its lower slope. Dilated gland-spaces with cylindric epithelium were seen in this fold, and into the mouths of one of these glands a villus had extended. At one other point there was an appearance as if villi had grown into the glands, but as this was seen nowhere else its occurrence was accidental. The villi were usually applied to the surface of the mucosa, and united to it by a layer of fibrin. Heaps of decidual cells were forming between the villi, the beginnings of the trabeculae of decidual cells of the fully-formed placenta. The ends of the villi stimulated the decidua to proliferate. The ends of the villi were continually shooting out tendrils winding in all directions, and from this period they were already washed with maternal blood from the open capillaries, and opened up still more these vessels, so that the blood now flowed unhindered between the villi up to the chorion. "It was demonstrated with certainty that the intervillous spaces were supplied with maternal blood from the earliest time of development." The second preparation was of a 14 days' ovum embedded in the mucosa. The gland-spaces in the mucosa were filled with irregular masses of swollen epithelium, and the capillaries were greatly dilated both in the serotina and in the lower and middle portions of the reflexa. This preparation showed that there was no ground for the idea that the ovum became embedded in the raw surface. The ovum was perched on a fold of mucous membrane which had its surface-epithelium still present on one side of it. This preparation confirmed the mode of attachment of the early ovum which had been generally received since the time of John Hunter. The points brought out by this section of Leopold's are the mode of closure of the upper pole of the reflexa and the mode of attachment of the ends of the villi. The gist of Leopold's conclusion as to how the ovum got its food at this early stage is that it is what has been described in the fully-formed placenta of the fourth month. In the process of gradual dilatation of the capillaries without rupture one must look for the beginning of maternal circulation in the placenta. Leopold differed with Hofmeier and Bloch in maintaining that the processes of decidual tissue carried arteries which opened into the spaces in addition to those which opened at their base. Barbour does not think that Leopold's sections established his conclusion that "already in the second or third week of pregnancy we have intervillous spaces communicating directly with the blood-vessels, and therefore must reject the view hitherto received that the spaces do not develop till the fifth month." If it should be shown that Hubrecht's description of the origin of the placenta in the hedge-hog is applicable to the human female, there might already be at this period a system of vascular lacunae communicating with maternal vessels. Then, too, these cells, which look like splits of decidua, and the epithelium, which suggest a surface of mucosa not yet eroded, are the relics of cells which are analogous to Hubrecht's trophoblast and trophospongiosa.

M. Herzog,¹ in an early placenta obtained from the living, found the following peculiarities: 1. In the amnion, near the insertion of the cord, there were found small cavities contained between 2 layers of amniotic mesoderm. It is possible that these are due to a duplication of the amnion occurring at an early stage of its formation. 2. The chorionic epithelium and that of the villi were represented by 2 distinct layers, each of characteristic differentiating

¹ Am. Gyn. and Obst. Jour., Apr., 1898.

features. The *Langhans layer of cells* was found in a single cell-layer only; nowhere in a double or triple layer. The epithelium did not possess a basement-membrane. 3. Plasmodial (*syncytial*) buds springing from chorion and villi were found abundantly. Plasmodial islands in the intervillous spaces did not exist; what appear as such are buds separated from their bases by the direction of the cut of the knife. 4. *Katchenko's cell-nodules* are likewise not at all islands floating in the intervillous space, but decidua and syncytial tissue detached from the decidua in the same manner as the buds are detached. 5. The chorion at the antiplacental pole still shows remnants of villi. 6. The decidua serotina, as well as the vera, showed already patches of tissue in a state of coagulation-necrosis. Where this latter was manifest there were found numerous leukocytes, many in a process of nuclear fragmentation. 7. The decidua reflexa was in that stage of degeneration that was first described minutely by Minot. 8. Evidences were still found in connection with the decidua reflexa which proved that it once was highly vascular and that the intervillous spaces filled with blood once surrounded the whole ovum. 9. The decidua serotina was not throughout its whole extent lined with vascular endothelium; nor had chorion and villi such a lining. 10. Changed remnants of the original uterine epithelium were occasionally found on the surface of the serotina and everywhere on the surface of the vera. 11. The open spaces of the spongiosa, the changed uterine glands, showed epithelium varying from the normal to a stage of complete degeneration, and these spaces were not filled with blood, but with mucoid or hyaline material, cell-remnants, and hyaline spheres. 12. The intervillous space contained maternal blood, which in its corpuscular elements was very different from the fetal blood found in the blood-vessels of the chorion and villi. 13. The main, if not the exclusive, source of the canalized fibrin was the maternal blood in the intervillous space. 14. In this space were also found numerous hematoidin-crystals; these insoluble derivatives of degenerating red blood-corpuscles are in part carried into the uteroplacental veins, and from these into the general maternal circulation. They stand most probably in a causal relation to the comparative frequency of embolism and thrombosis during pregnancy and after parturition.

The Normal Site of the Placenta.—Caruso¹ gives the results of his extensive investigation of the question of the relative frequency with which the placenta is implanted on different parts of the uterine wall. He finds that the commonest site is on the anterior wall, and the next commonest on the posterior wall. The implantation at the fundus is rarer, that on the right lateral wall rarer still, and that on the left lateral wall the rarest of all. He draws the following practical conclusions: 1. Efforts at external version should not be too long continued or too energetic, for the placenta is generally situated on the anterior wall of the uterus. 2. On introducing a catheter into the uterus to bring on premature labor, the instrument should be guided along the left side of the organ. 3. In the Cesarean operation the placenta is most likely to be avoided by making the uterine incision at the fundus.

A Comparative Study of the Pelvic Diameters of the Mother with the Diameters and Circumferences of the Child's Head at Birth.—T. R. Marshall² offers the query, Has the size of the mother's pelvis anything to do with the size of the child's head—*i. e.*, is there a proportionate relation? If there is a roomy pelvis, will the child's head be correspondingly large, and *vice versa*? He gives the tabulated measurements of 32 consecutive cases taken by himself while in service at the Maryland Lying-in Asylum, at Baltimore. The children were all born at about full term. The antero-

¹ Centralbl. f. Gynäk., July 17, 1897.

² Va. Med. Semi-monthly, Feb. 25, 1898.

posterior diameters of the pelvis refer to the external conjugate superior strait. To arrive at measurements for the true conjugate, his rule was to subtract 3 in. from the measurements of the external conjugate.

Number of Case.	MOTHER.			CHILD.							
	Distances in Inches.			Diameters.				Circumferences.			
	Between Anterior Iliac Spines.	Between Iliac Crests.	Anteroposterior Diameter.	Occipitofrontal.	Occipitomen- tal.	Suboccipito-bregmatic.	Biparietal.	Occipitofrontal.	Occipitomen- tal.	Suboccipito-bregmatic.	Biparietal.
1	9.00	10.50	8.00	4.50	5.50	4.125	3.75	13.50	15.00	12.00	13.50
2	9.00	11.00	7.50	4.50	4.75	3.75	3.375	13.00	13.50	11.50	11.00
3	9.75	10.25	8.25	4.75	5.00	3.625	4.00	12.50	13.00	11.50	13.00
4	10.00	10.75	7.50	4.50	5.50	4.00	3.50	13.00	14.50	11.50	13.00
5	9.00	10.50	7.25	4.50	5.125	3.75	3.75	13.00	15.00	12.50	13.00
6	9.50	11.00	7.75	4.625	5.375	3.75	3.625	13.50	15.50	12.00	12.00
7	9.50	10.50	7.50	4.375	5.125	3.25	3.25	13.00	15.00	12.00	12.00
8	9.00	11.00	8.25	4.625	5.50	3.875	3.625	13.00	15.00	11.50	12.50
9	9.00	10.25	7.75	4.375	5.50	3.875	3.75	13.50	13.00	12.50	12.50
10	9.50	10.50	7.75	4.625	5.50	3.75	3.50	13.50	15.00	11.50	12.00
11	8.00	10.75	7.50	4.50	5.125	3.75	3.50	13.00	15.00	11.50	12.00
12	9.75	11.50	8.00	4.75	5.50	4.00	3.625	13.50	15.00	12.00	13.50
13	12.00	11.50	8.00	5.25	5.75	3.125	3.75	14.50	16.00	12.50	14.00
14	9.50	12.50	8.00	4.375	5.50	3.875	3.75	13.00	15.00	11.00	12.50
15	9.25	11.00	7.75	4.75	5.375	3.75	3.50	13.50	12.00	13.50	12.50
16	9.25	11.50	7.75	4.25	5.50	3.00	3.50	12.50	13.00	9.50	11.50
17	8.75	10.00	7.75	5.00	6.00	3.875	3.875	15.50	17.00	13.50	15.00
18	9.50	10.75	8.75	4.875	5.75	3.75	3.625	14.00	15.00	11.50	13.00
19	10.25	11.25	7.50	4.375	5.125	3.625	3.375	13.00	14.50	11.50	11.00
20	9.50	11.00	7.75	4.75	5.875	3.75	3.625	14.00	16.00	12.00	12.50
21	9.50	10.50	7.50	4.50	5.50	3.75	3.50	13.50	15.50	12.00	13.00
22	9.25	10.25	8.00	4.50	5.625	3.75	3.75	13.50	15.00	12.00	13.00
23	9.00	10.00	8.00	4.75	5.50	3.50	3.75	14.00	16.00	12.00	13.00
24	10.50	12.00	8.00	4.00	4.50	3.50	3.25	12.00	12.25	10.50	10.50
25	9.00	10.50	8.00	4.50	5.25	3.75	3.50	13.50	15.00	12.00	12.50
26	9.50	10.75	8.25	4.375	5.25	3.625	3.25	13.00	14.50	11.25	11.50
27	9.00	9.50	7.75	4.50	5.50	3.50	3.50	13.00	15.00	11.00	13.00
28	9.25	11.00	7.75	4.50	5.00	3.25	3.50	13.50	12.00	13.50	12.00
29	9.50	10.50	7.50	4.50	6.00	4.125	3.625	13.00	15.50	12.50	13.00
30	9.00	10.00	7.50	4.50	5.50	3.25	3.50	13.50	15.50	11.50	13.00
31	10.00	11.50	7.75	4.50	5.00	3.50	3.25	13.00	12.50	11.50	11.00
32	9.00	10.50	7.50	4.625	5.125	3.625	3.75	13.00	14.50	11.25	11.00
Ave., inches	9.4375	10.7812+	7.7501-	4.5625+	5.3437+	3.6250	3.5937+	13.3125	14.6594	11.8437	12.5937+

The Determination of Sex.—Schenk,¹ of Vienna, who was reported as saying that he had discovered the secret of sex, states that he has been misreported. He simply made an assertion in the course of a lecture that it was possible, to a certain extent, to correct nature in the case of a woman who has become the mother of 5 or 6 girls in succession. He did not even announce it as a discovery—a newspaper correspondent, to whom one of the students mentioned the subject, being responsible for the noising abroad of the observation and its exaggeration. The result has been that the professor is deluged with letters from women all over the world, who want to know how to get boys. The statement of Schenk has given rise to a large number of would-be followers all over the world, who advance various rules and methods of determining the sex of the forthcoming child. D. E. Keefe² has formulated the following: 1. When both father and mother are matured—that is, over 20 years—if the vigor of the husband is relatively greater than the wife's, expect a female child. 2. When with all other conditions the same as in 1, only that the mother is relatively more vigorous than the father, expect a boy. 3. When the parents are relatively of equal vigor, expect an equal division of the children, as to sex, for nature seeks the conservation of the sexes; if, however, with the vigor the same, the complexion of the mother is dark and that of the father

¹ Med. Rec., Feb. 5, 1898.

² Charlotte Med. Jour., Apr., 1898.

is light, one may rather expect a boy; if, on the other hand, the father is of dark and the mother of light complexion, a girl is probable. 4. When one of the parents, though apparently as vigorous as the other, is comparatively either immature or senile, consider the one nearest the age of stalwart maturity as the more vigorous. For example: A wife 16 to 18, or 42 or over, with a husband 25 to 40, prognosticate a daughter. On the other hand, with a husband 16 to 20, or 48 or over, and a wife 20 to 35, expect a male child. Very many exceptions to these rules will occur.

THE DIAGNOSIS OF PREGNANCY.

The Diagnosis of Early Pregnancy.—W. T. Gardner¹ makes the following observations on the diagnosis of early pregnancy in 75 cases. The value of the sign "morning-sickness" he considers very much overestimated. A typical morning-sickness is not infrequently met with in patients who have a uterine displacement or an extensive salpingitis. The breast-signs are most constant and most reliable in those pregnant for the first time. The enlargement of the papillæ comes the earliest, and is the most constant and easily recognized. Enlargement and tenderness on pressure are very early and constant signs. The fat breast is large, soft and, even in primiparæ, is more or less pendulous; while the breast of early pregnancy is firm and stands out from the chest-wall. By the end of the third month milk is present in nearly all cases. Pigmentation of the areola never entirely disappears, and thus this sign is of very little value after the first pregnancy. The blue discoloration of the vagina he considers of great value in the later stages of gestation. In 75 cases under 3 months he detected it 15 times. The velvety feel due to the superficial softening of the vaginal portion of the cervix he found in all of the 75 cases. A similar condition is, however, found in some of the inflammatory conditions of the uterus. In a very large percentage the uterus was found tilted forward. The most important of all signs in the early months, and one, without which he does not make a diagnosis, is the cystic feel of the uterus. Practically a cystic uterus is always a pregnant uterus. There is, however, one exception to this statement—a cystic fibroid will give nearly the same sensation as a pregnant uterus. The variety of the cystic fibroid, its comparatively slow growth, and the absence of other signs of pregnancy make the diagnosis clear.

Palpation of the Fetal Heart-impulse in Pregnancy.—Duval² remarks that it is not generally known that the fetal heart may, under certain conditions, be actually felt beating through the abdominal walls of the pregnant woman. In this country but 2 cases have been observed, those of Kelly, which he now reports. The first was in 1884 and the second in 1895. They represented the right bregmatic-iliac-anterior and left occipito-iliac-posterior presentations, the latter being observed in the eighth month of pregnancy, all previous cases occurring during labor. Of the other observers, Fischel, in 1881, was the first to publish a definite account, describing accurately 3 cases in which this phenomenon occurred. These cases represented the left bregmatic-iliac-anterior, the right occipito-iliac-posterior, and the left mento-iliac-anterior presentations. Valenta, however, in 1885, claimed priority of observation, stating that he had noted it in 1860 in a first face-presentation, and had recorded it in his text-book on midwifery, and that since then he had repeatedly spoken of its importance as a diagnostic sign in anterior face-presentations. Fleischmann, in 1885,

¹ Am. Jour. Obst., Jan., 1897.

² Bull. Johns Hopkins Hosp., Oct., 1897.

stimulated by Fischel's communications, published an interesting case in which this phenomenon was observed in a right mento-iliac-anterior presentation.

Importance of Abdominal Palpation Compared to Vaginal Examination.—Ahlfeld¹ does not agree with the recommendations of Leopold to employ abdominal palpation exclusively as a means of diagnosis during the progress of labor. Abdominal palpation alone is not sufficient to recognize existing or impending dangers; intrapartum its execution is difficult and, if thoroughly performed, not free from danger. The obstetrician who manages a labor-case without performing vaginal examination is largely trusting to chance. With proper asepsis vaginal examinations are free from danger. [Both Ahlfeld and Leopold occupy extreme positions. Abdominal palpation and vaginal examinations are of great and unquestionable value, and used conjointly they enable us to make a correct diagnosis. Leopold, in his first essays, drew attention to the absolute neglect of abdominal palpation, and pointed out its value as a means of diagnosis; he also showed that puerperal infection often follows vaginal examinations, and that a decrease in the number of examinations decreases the dangers of infection. Whenever the physician is not positive that everything proceeds normally a thorough vaginal examination is certainly indicated. It would be bad obstetrics to wait until actual complications have appeared; but frequent and aimless vaginal examinations cannot be too severely condemned. Concerning the danger of abdominal palpation, we cannot recall a single case in which an accident has followed its employment, nor can we imagine that such could occur except its execution had been most brutal.]

The X-rays in Obstetric Diagnosis.—Levy and Thurnim² record a method of measuring the dimensions of the pelvis by means of the Röntgen rays. Previous attempts had been made by means of plates introduced into the vagina, and had failed on account of the limited space and the length of exposure required. The authors place the patient horizontally over a plate 10 by 16 in. in size, and set the tube vertically over the symphysis, and exactly 20 in. above the center of the plate; an exposure of 2 to 5 minutes suffices to give a satisfactory skiagraph, on which the pelvis is faithfully represented. This is measured, and as the distance of the tube from the plate is known, the pelvic dimensions can be accurately computed. To facilitate this Levy has designed an instrument on the principle of the pantagraph, by which the true conjugate can be mechanically determined. The transverse diameters at the brim and outlet can be estimated with equal certainty, and the method has been satisfactorily tested in a number of cases in Landau's clinic. Further investigations have been carried out by the authors on pregnant women with flat pelvis, in order to ascertain the dimensional relations between the fetal head and the pelvic outlet, but the results are not at present unobjectionable; further research is being undertaken, and a satisfactory and practical outcome is anticipated.

THE HYGIENE OF PREGNANCY.

The Administration of Strychnin Phosphate during Gestation.

—W. B. Dorsett,³ after a faithful trial of strychnin in combination with iron or the bitter vegetable tonics, found it was followed by unsatisfactory results in many cases, and it occurred to him that free phosphorus would probably answer the purpose if combined with iron. This combination, however, resulted in

¹ Canad. Pract., Aug., 1897.

² Deutsch. med. Woch., Aug. 5, 1897.

³ Am. Jour. Obst., Oct., 1897.

disappointment, and the author was compelled to give up its use on account of the derangement of the stomach it almost always produced. The eructation of gases impregnated with the phosphorus was another and serious objection. However, not wishing to give up the use of a remedy which he regards as theoretically of value, he began the use of the chemical union of phosphorus and strychnin as prepared by Merck. Afterward he used gelatin-coated pills, each containing $\frac{1}{100}$ gr. of strychnin phosphate. Under its employment a good appetite and a good assimilation are obtained in the general weakness and debility of the anemic, constipation is relieved, and, in short, the patient is built up and placed in a good condition to pass through the ordeal of labor; the uterus contracts promptly after the third stage of labor, and the use of ergot may be entirely dispensed with. If it is necessary to use the forceps, the patient is given a hypodermic injection of $\frac{1}{30}$ gr. of strychnin or strychnin phosphate as soon as the anesthetic is begun, but no ergot is ever used. He has also observed that after the continuous use of strychnin phosphate the uterus contracts promptly after the second stage of labor; and in many cases the application of Credé's method of expression of the placenta is not needed to bring it away, and no postmortem hemorrhages have occurred. The often-observed chilliness or rigors which, in the majority of cases, follow labor have been noticed in but few cases. These rigors, so common after labor, little account of which can be found in the text-books, are nothing more or less than surgical shock. This is obviated by the prophylactic—strychnin. Dorsett states that he has used strychnin for some time in abdominal surgery, for the purpose of preventing shock and to control the pulse during the operations, and in this way was led to its use in obstetrics; also, that he has found strychnin phosphate to act better as a laxative than either the sulphate or nitrate.

The Action of Ergot on Pregnant Women.—Lombe Atthill,¹ who has freely employed ergot in combination with strychnin during gestation, sums up his conclusions as follows: 1. That when administered previous to the termination of pregnancy in the case of women in whom a tendency to postpartum hemorrhage is known to exist, it tends in a marked manner to prevent the occurrence of hemorrhage. 2. That when so administered in ordinary doses it does not produce any injurious effect on either mother or child, and that its exhibition seems to delay the commencement of labor in such case. 3. It tends to make involution of the uterus more perfect, and lessens the chance of the occurrence of subsequent uterine troubles, many of which depend for their cause on imperfect involution of that organ. 4. It will not bring on premature labor or induce abortion unless uterine action has previously been set going. 5. In cases of threatened abortion its administration frequently seems to act as a uterine tonic, and in some cases tends to avert the danger of a miscarriage, provided the ovum be not blighted. 6. That if the ovum be blighted, and especially if it be detached, ergot usually hastens its expulsion.

PATHOLOGY OF THE FETUS AND OF THE FETAL APPENDAGES.

Malignant Deciduoma.—[The discussion over this curious and rare neoplasm still waxes hot. The investigators group themselves into two classes: those who regard the tumor as allied to the carcinomata and those who look upon it as a most malignant sarcoma. We can do no better than to present the theories and arguments of each, and leave the ultimate decision to time and

¹ Brit. Med. Jour., Mar. 6, 1897.

further developments.] N. Bellin¹ has made some careful observations of the pathologic characters and clinical features of hydatidiform mole and malignant deciduoma, and states very clearly the relationship that exists between them. Both are due to changes in the placental or the decidual tissues, and clinically both are characterized by uterine hemorrhage, less severe, however, in the deciduoma than in the mole. The prognosis in the case of mole is fairly good, since the mass is usually expelled entire; but in the deciduoma, owing to the possibility of the early involvement of the blood-vessels and consequent formation of metastases, it is grave. Histologically the mole is a myxomatous degeneration of the fetal mesoderm; a local hypertrophy occurs, with but little tendency to invade the adjacent structures, and with a purely secondary rôle played by the epithelial elements. It always arises primarily from the villi. The deciduoma develops from the fetal ectoderm, and is therefore epithelial in its character. It may arise from the synectium of a normal villus, or from synectial remains in a mole or placental polypus. It may also develop from the fetal ectoderm while this is still in a formative state, and invagination and infolding have not as yet begun; in such a case it consists entirely of large characteristic plasmodial masses. Further study shows that those special protoplasmic masses have an especial fondness for the maternal blood-vessels, whose walls they early invade and replace, thus forming lacunæ in the circulation, whose walls are lined with epithelium, an unique condition in the histology of tumor, and with its only counterpart in the history of the placenta. In such cases myxomatous degeneration of the villi does not occur. The firm attachment of this ectoplacental growth upon the uterine wall is favored by asepsis, since the absence of microorganisms permits the medium to remain in the best possible condition for further growth. Intervention in the case of a mole requires simply the evacuation of the mass; with the deciduoma, on the contrary, the diagnosis must be made early in the development of the mass, and the treatment must be immediate and radical if cure is to be expected. Even after a thorough extirpation of the growth, the patient should be kept under observation for many months to detect possible metastases, which are prone to occur in the lungs, liver, and other organs.

H. L. Williams² states that as the so-called malignant deciduoma has its origin in the epithelial covering of the chorionic villi, and not from the decidua-cells (as has been supposed), the neoplasm is allied to the carcinomata rather than to the sarcomata; hence, he prefers the term *chorio-epithelioma*. All cases of the disease that have not been operated upon have terminated fatally. The prominent histologic features of the growth are as follows: 1. A fibrous reticulum resembling organized blood, in the meshes of which are large spaces containing blood and fibrin, but no glands, blood-vessels, or lymphatics. 2. Bars, bands, and islands of synectial and Langhans's cells between the blood-spaces and in masses throughout the growth. 3. Vacuoles in the synectial protoplasm, and in some cases distinct chorionic villi. 4. A small round-celled infiltration in the fibrous reticulum, and also in the homogeneous protoplasm, is also conspicuously present. He gives some microphotographs of the condition. In speaking of deciduoma malignum, W. E. Fothergill³ remarks that there are under consideration 4 tissues—namely: 1. Fetal connective tissue—the stroma of the villi. 2. Fetal epithelium—covering the villi. 3. Maternal epithelium—lining the uterine glands. 4. Maternal connective tissue of the uterine mucosa, including the decidual cells. The term *chorioma malignum*, it is clear, might be suitably applied to a malignant

¹ Gaz. hebdom. de Méd. et de Chir., N. S., ii., 146, 1897.

² Am. Jour. Obst., Apr., 1898.

³ Practitioner, Mar., 1898.

growth derived either from the first or second of these, the elements of the chorion. If epiblastic, such a growth would be a chorionic carcinoma; if mesoblastic, it would be a chorionic sarcoma. A malignant growth derived from the third or fourth—the maternal epithelium and the connective tissue of the decidua—might be called a *deciduoma malignum*. If epiblastic, such a growth would be a decidual carcinoma; if mesoblastic, a decidual sarcoma. Thus 2 questions present themselves: 1. Can fetal elements invade the maternal structures, forming primary and secondary deposits with a characteristic appearance? 2. Can the uterine mucosa, as modified by pregnancy, produce a carcinoma or a sarcoma differing essentially from corresponding growths derived from the uterine mucosa apart from pregnancy? The view that the fetal connective tissue which forms the cores of the villi can produce a sarcoma of chorionic origin has been so little supported that it is not at present necessary to consider it. While it is easy to state in reference to a case of malignant disease following pregnancy that the new growth is of chorionic—*i. e.*, fetal origin—in none of the cases referred to has any satisfactory proof of the statement been given. There are, however, several facts which suggest strong *à priori* reasons for holding that such an invasion of maternal structures by fetal elements is extremely unlikely to occur: 1. Those chorionic villi which do not enter into the formation of the placenta disappear almost entirely as pregnancy advances; their growth ceasing as soon as they are deprived of their fetal blood-supply. 2. All the portions of the placental villi which become embedded in the decidua during pregnancy completely lose their fetal blood-supply and also their covering of chorionic epithelium. 3. All villi in which, toward the end of normal pregnancy, the fetal circulation ceases, lose their epithelium. The same occurs in pathologic placental infarction. 4. In placental polypi and sarcomatous moles which are long retained *in utero* the chorionic epithelium of the villi gradually disappears. This is also true of smaller placental relics retained *in utero* after abortion. In all of these cases the chorionic epithelium is destroyed probably by the enlarged connective-tissue corpuscles of the uterine mucosa known as decidual cells. It is certainly true that during the first few weeks of pregnancy the chorionic epithelial cells covering the tips of the villi eat up and destroy the superficial cells of the maternal mucosa. This destructive action of the fetal parasite on the maternal organism ceases, however, when the placenta is formed. The placental circulation provides for the nutrition of the fetus without further consumption of the maternal mucosa; and it is the very destruction by the ovum of the surface of the mucosa which opens the maternal vessels and allows the maternal blood to flow into direct contact with the placental villi. This stage reached, the decidua reacts against its invasion by fetal structures. In short, before the placental circulation is established fetal epithelial cells have a phagocytic action upon decidual tissue; but from the time of establishment of the placental circulation decidual cells have a phagocytic action on chorionic epithelium. Fetal epithelium cannot long exist when in contact with decidual tissue, and it is therefore impossible that fetal structures should originate malignant disease during or after ordinary pregnancy. It is, however, possible that, in certain morbid conditions of the decidua, the decidual cells may fail to keep the fetal cells within bounds. Thus a true chorioma malignum may exist, possibly after vesicular degeneration of the chorion. As to the second question, the superficial epithelium of the uterine mucosa disappears early in pregnancy. These epithelial cells which exist throughout pregnancy line the uterine glands in the layer of the mucosa which is shed with the placenta. They degenerate early in pregnancy, and are thereafter incapable of growth. The only maternal epithelium which lives during

pregnancy lines the uterine glands in the deep layer of the mucosa, which, at labor or abortion, remains attached to the uterine muscle. There would seem to be no advantage in applying the name *deciduoma malignum* to carcinomata derived from these maternal epithelial cells. Such growths are simply cancer of the body of the uterus, whether observed in connection with pregnancy or not. But most of the recorded cases have been described, after Sanger, as sarcomata—sarcoma uteri deciduo cellulare—and one said to be derived from the well-known decidual cell—*i. e.*, from the round cell of the uterine mucosa as modified during pregnancy. If we accept the teaching of Keinicke, that the sarcomata in question are derived from the uterine muscle, and not from the mucosa at all, there is no need to go further; but if we allow that these now celebrated growths originate in the connective tissue of the uterine mucosa, it is still far from clear that their origin is due to pregnancy; for several authors have stated that the round cells of the uterine mucosa may be enlarged and altered under conditions quite apart from pregnancy, and that therefore the presence of large cells in a uterine sarcoma does not show that there is any causal connection between the neoplasm and pregnancy. There therefore appears to be no excuse for adding the words *deciduo cellulare* to the name of a sarcoma on account of the presence in it of large cells, but to do so is perhaps less misleading than to apply the useless term *deciduoma malignum*.

Webster¹ divides the cases of malignant deciduoma into the following groups: 1. Those in which the primary growth and metastases are composed of cells of sarcomatous, carcinomatous, or mixed sarcomatous and carcinomatous types. 2. Those in which the structure is that found in the first group, along with syncytial structures, irregularly shaped masses of nucleated plasmoidal protoplasm. 3. Those in which the structure is that found in the second group, along with structures resembling placental villi. Gebhard² reports 2 cases of syncytionia malignum, and describes the growth in detail. He also describes a third case, in which a tumor of the vaginal wall was present, which was removed, the patient subsequently perishing. Postmortem examination revealed multiple metastases, the original growth having been malignant. A careful study of the third case leads the writer to class it as a syncytionia. He also describes a carcinoma whose cells took on the same peculiar and irregular wandering growth which is peculiar to syncytionia. It is evident that a most careful examination is required to make a positive diagnosis between the two.

Pick³ insists that an innocent vesicular mole may produce metastases; that Neumann's theory that proliferating syncytium in the stroma of villi proves malignancy is incorrect; and hence total extirpation of the uterus is not called for on such evidence alone.

Bearing directly upon the foregoing subject are the researches of Fothergill⁴ upon the ultimate fate of placental tissue retained *in utero*. He remarks that after the fetal circulation ceases the small fetal blood-vessels of the placenta quickly disappear entirely, the larger ones being more slowly obliterated and leaving for some time a few blood-crystals and amorphous granules to mark their position. The fetal connective tissue between the epithelial layers of the amnion and chorion, as also that forming the cores of the villi, is compressed, but is not otherwise altered for a long time. The fetal epithelium covering the amniotic surface of the placenta remains recognizable for a long time; the cell-outlines, however, are lost, and the nuclei become clouded. The fetal epithelium of the chorion covering that membrane itself and the villi which spring from it also lose the cell-outlines, and the nuclei soon cease to stain clearly.

¹ Canad. Pract., Oct., 1897.

² Zeit. f. Geb. u. Gynak., Band xxxvii., Heft 3, 1897.

³ Monats. f. Geb. u. Gynak., Oct., 1897.

⁴ Brit. Med. Jour., Jan. 29, 1898.

Meanwhile a great change occurs in the maternal circulation. The space between the uterine wall and the chorion coextensive with the placenta is crossed by numerous villi, while innumerable smaller villi hang freely from the chorion without reaching the surface of the decidua. Into this great intervillous space maternal blood flows from the uterine wall during the life of the fetus, and returns into the maternal vessels after circulating among the villi. When the epithelial covering of the villi degenerates after the stoppage of the fetal circulation, the maternal blood in the intervillous space does not long continue to move, but soon forms a firm blood-clot embedding the villi. This intervillous blood-clot consists so largely of fibrin that it is probable that the degenerated epithelium of the villi acts as a foreign body, layer after layer of fibrin being deposited upon it from the maternal blood until the whole intervillous space is thrombosed. Thus, a placenta retained *in utero* for a few days after the death of the fetus consists of a mass of villi embedded in maternal blood-clot. While this mass is bounded on the fetal aspect by the amnion and chorion, it is bounded on the uterine aspect by the decidua serotina. It was previously known that in retained placenta the fetal epithelium gradually disappears and that the blood-clot in the intervillous spaces becomes organized after a time. Now we learn that the decidual cells destroy both the degenerated fetal epithelium and the fibrinous masses in the intervillous spaces, and that these same cells replace the material removed by a delicate connective tissue. In other words, the decidual cells destroy the fetal epithelium and organize the blood-clot; they have a phagocytic as well as a constructive action.

Origin of Gelatiniform Cysts of the Placenta.—Delore,¹ in connection with a research on the maternal circulation in the placenta, advances a new explanation of the mode of origin of gelatiniform cysts on the fetal surface of the placenta. He believes that the jelly of Wharton exists not only in the umbilical cord, but also in the placenta, and especially in the chorio-allantoidian layer. Retention of this jelly by such an accidental obliteration as happens in sebaceous cysts leads to formation of the gelatiniform placental cyst. If such a cyst be incised, it may be seen that it is an accidental cavity produced by a gluing together of the villi by fibrin and a separation of the chorionic membrane.

Effects of Hereditary Syphilis upon the Placenta, Cord, Fetus, and Child.—J. D. Bissell² states that the cause of death of syphilitic children *in utero*, is, in the vast majority of cases, a diseased condition of the placenta or cord, rather than the breeding of the syphilitic virus in the fluids of the fetus itself. Six cases are reported, 3 of which were born dead and macerated, and in each there were positive evidences of fatal interference of the blood-supply to the fetus. In the cases born alive no evidence of disease was appreciable in the placenta or cord. In one of the cases the vessels of the cord were occluded for about 3 in. by a deposit, the result of inherited syphilis. Another case presented a placenta which had undergone cheesy degeneration; it was thick, yellowish in color, very friable, the disease being situated in the villi, transforming the placenta into a nonfunctionating organ. At the junction of the cord with the abdomen there was a failure of development in the cord itself, the vessels being patulous, but not sufficiently so to allow the requisite amount of blood to pass to and fro, which, undoubtedly, was an active factor in the early death of the fetus. Hydramnion—a condition somewhat characteristic of a syphilitic pregnancy—occurred in another case, evidently the

¹ L'Obstét., ii., No. 5, p. 422, Sept. 15, 1897.

² Am. Gyn. and Obst. Jour., vol. xi., No. 2, 1897.

result of interference in the fetal circulation occasioned by the diseased placenta. Another died at $5\frac{1}{2}$ months, due principally to failure of development of the umbilical vessels.

Acetone in the Urine of Pregnant Patients as an Indication of Fetal Death.—Knapp¹ reports, from the German obstetric clinic of Prague, 10 cases of fetal death at various periods of gestation in which, upon the day of labor, acetone was found in the urine; this substance was also present during the 3 days following labor. Some of these patients were syphilitic, but the influence of syphilis upon the presence of acetone is not determined. Half of the cases reported had suffered from syphilis, or were syphilitic at the time of pregnancy. To ascertain the presence of acetone von Jaksch's method was followed; this consists essentially in adding to the urine sodium nitroprussid, and then either caustic soda or potassa to alkaline reaction. Acetic acid is then dropped into the fluid until the characteristic purple or violet color develops. Another excellent test consists in adding to a test-tube filled with the urine a few drops of a solution of fuchsin (1 : 2000) previously decolorized by sulphuric acid. If acetone be present a violet color is produced, varying in depth with the percentage of acetone.

Intrauterine Typhoid Fever.—W. Fordyce² read a paper on this subject before the Edinburgh Obstetric Society, giving notes of a case that had come under his observation. It is already known clinically that syphilis, variola, scarlatina, and measles can be transmitted from the mother to the fetus *in utero*. In diseases like typhoid, when there are less patent physical appearances, the evidence of transmission is not so manifest. Bacteriologic and microscopic methods have now made this more easy. Most authorities are agreed that pregnancy *per se* has no unfavorable influence on the course of enteric fever. Vinay, in 183 cases from different reporters, found a mortality of 17%, which is not above the average in nonpregnant women. Enteric fever, however, materially influences the course of gestation, since abortion occurs in something like two-thirds of the cases. Thus Saecquin collected 310 cases, and found abortion in 199; while Martinet found 66 abortions in 109 cases. What are the causes of abortion? In one it may be the high temperature; in another the accumulation of toxins in the blood, the death of the fetus with consequent placental changes, hemorrhage between the placenta and uterine site in consequence of the typhoid, etc. Then there is the personal factor, for in typhoid of even a mild type abortion may occur very early in the disease, while in a case of the gravest description gestation may go on to full time. Returning to his own case, Fordyce said the fetus was a fresh and healthy 5 months' specimen. On opening the abdomen antiseptically a small quantity of serous fluid was found. This and blood from the cord were retained for Widal's test. The intestines seemed healthy, while the liver and spleen were not enlarged. Inoculations were made from the kidney, spleen, intestinal contents, and the blood of the left ventricle into tubes of agar-agar and gelatin. The first 3 inoculations gave a culture of a bacillus identical with that of Eberth's bacillus, while the tube inoculated from the blood remained sterile. To eliminate the possible fallacy of the presence of the *Bacillus coli communis*, Widal's agglutinative test was tried. The diluted serum taken from the peritoneal cavity was brought into contact with a pure culture of typhoid bacilli, and gave rise to the characteristic clumping and agglutination of the active bacilli. The result of the experiment with the blood from the left ventricle was not so striking. Further, the bacilli from the cultures noted above produced no curdling of milk; therefore the *Bacillus coli communis* was excluded. Microscopic

¹ Centralbl. f. Gynäk., No. 16, 1897.

² Brit. Med. Jour., Feb. 19, 1898.

sections of the liver, spleen, kidney, placenta, and umbilical cord had as yet failed to show the specific bacilli of enteric fever; but this failure was not unusual. In the earliest investigations on this subject, proof of the existence of fetal typhoid was naturally sought for in lesions of the intestine. Thus Manzoni, in 1841, and Charcelay, in the same year, described changes in the small intestines of 2 fetuses that suggested enteric fever. In 1862 Weiss described another case. But it was not till 1885 that bacteriologic examination of the fetal organs was first undertaken by Reher, when a sixth-month fetus born on the nineteenth day of typhoid fever gave pure cultivations of Eberth's bacillus from its liver and spleen. Neuhass, in 1886, in a 4 months' fetus obtained similar results, and in 1887 the observations of Neuhass and Widal were further confirmed. In 1893 Eberth, from a third-month fetus expelled with intact membranes, got pure cultivations of the typhoid bacillus from the blood in the heart and the various fetal organs. Similar observations have been published by Freund and Levy, Ernst, Durk, and others. In cases published last year Widal's test was applied with varying results, mostly, however, confirmatory. The following conclusions seemed to Fordyce to be warranted: (1) That typhoid fever can be communicated to the fetus *in utero*. (2) That as a result of this infection the fetus may die and be expelled prematurely. (3) That the fetus may be born alive, but weakly and evidently suffering from the infection. (4) That the fetus may be born alive and healthy, having passed through the infection *in utero*. Finally, it may be added that infection of the child in cases of maternal typhoid does not of necessity follow. Cases are on record in which the most careful bacteriologic examination failed to discover the pathogenic organism in the fetal organs; for example, the cases recorded by Fränkel and Kinderlen. The conditions under which the fetus becomes infected are difficult to determine. The first experiments in the lower animals seemed to show that the epithelium covering the fetal villi formed a barrier to the migration of pathogenic organisms as well as to the passage of other substances not in a state of solution. This, however, was not in accordance with clinical experience, and since 1882, when Arloing, Cornevin, and Thomas found the specific bacillus in a young sheep, the mother of which was affected with anthrax, numerous experiments with the specific organisms of chicken-cholera, glanders, septicemia, tuberculousis, recurrent fever, and erysipelas prove conclusively that migration in these diseases can and does take place from the maternal to the fetal circulation. According to Malvoz and others, this can take place only when there is some placental lesion destroying the villous epithelium. Others hold that living microorganisms can directly penetrate this epithelium. Positive proof that there is no placental lesion in any given case is almost impossible. If such a lesion were necessary, then it may be produced by the organs accumulating on the villus where it hangs free in the maternal circulation. The theory of Malvoz best explains how it is that in twin-pregnancies in certain infectious diseases the one fetus is infected and the other is not.

The Physiology and Pathology of Antenatal Life.—J. W. Ballantyne¹ describes the physiology of antenatal life, subdividing it into 3 periods: 1. *Germinal life*, about which little is known in the human subject, the period which ends in the mysterious phenomena of germ- and sperm-maturation, of the expulsion of the polar globules from the ovum, of the atrophy of the female element of the sperm-cell, and of the impregnation of the ovum by the spermatozoon, with the resulting formation of the morula-mass. 2. *Embryonic life*, the period beginning with the differentiation of the blastoderm

¹ Brit. Med. Jour., June 11, 1898.

and ending about the end of the second month, the period of evolution or development during which the lines of future growth are laid down. 3. *Fetal life*, the period in which the organism shows its vitality chiefly by growth along lines which have been already definitely laid down. It is necessary to point out, however, that these periods cannot be sharply marked off from one another. One part may be in the embryonic stage while the others are in the fetal. The third month of intrauterine life more than any other is characterized by readjustment and by change, most of the organs passing at this time from the embryonic into the fetal state.

Ballantyne said that a prolonged study of antenatal pathology has led him to the conclusion that the fetus is liable to the same diseases as the infant, the child, and the adult. It enjoys partial immunity from parasitic skin-diseases and is protected from external violence; and, on the other hand, is apt to be affected with certain maladies in an aggravated form, and it is exposed to one gross traumatism—parturition. Fetal peculiarities are largely due to peculiarities of environment and physiology. In illustration of this, he describes fetal ichthyosis, general fetal dropsy, fetal ascites, hydronephrosis, cystic kidney, fetal endocarditis. He had some years ago called this peculiarity of fetal diseases their “potential mortality”—that is, the fetal environment and mode of life permitted the existence of an amount of disease quite incompatible with the maintenance of extrauterine life; the fetus was potentially dead, and would die as soon as it was born. Fetal maladies also differ in character as well as degree from those occurring after birth—for example, fetal small-pox, in which the face is almost free from the eruption; crusts are seldom formed, and the cicatrices are but feebly marked, because *in utero* the skin is kept moist, and is not under the influence of light and air; fetal typhoid fever, in which, probably because of the quiescent condition of the bowel and the infection being by way of the placenta, it is rare to find any intestinal lesion. By means of the placenta the fetus is able to live with several of its viscera in a far advanced stage of disease; while, on the other hand, it is exposed to fevers and microbic conditions affecting the mother, altered blood-states, and such poisons as lead, arsenic, morphin, alcohol. From recent investigations it seems possible that infection occasionally finds its way from the maternal blood through the amniotic fluid to the mouth and stomach of the fetus. The placenta, in its fetal portion, is an organ of the fetus, and being the most vulnerable of its organs, injury to it soon endangers fetal life. According to Porak, it has the power of storing up certain poisons; but this, if it does not poison the fetus, interferes with its own functions and leads to abortion or premature labor. The distinctive postmortem change of the fetus dying *in utero*, maceration rather than putrefaction, is also due to the intrauterine conditions preventing access of air. Ballantyne is quite certain that rigor mortis occurs. Probably every variety of neoplasm has been met with in fetal life. As to the pathology of embryonic life, the morbid states arising during this stage are very peculiar, but it is now beginning to be realized that they are subject to the same laws as general pathology. Teratology is a chapter of pathology. The one function of the embryo is to evolve the 3 layers of the blastoderm into the complex aggregate of organs and tissues which make up the body of the fetus. When a morbid cause acts on the embryo it interferes with this function, and a monstrosity or a structural anomaly is produced.

Ballantyne then described the experiments of Dareste, Patau, Warynski, Fol, and Lombarduir, and especially of Féré, in this connection—for example, by partially varnishing eggs during incubation, raising or lowering the

temperature of the incubator, shaking the eggs or wounding their contents, injecting various substances (alcohol, nicotin, etc.).

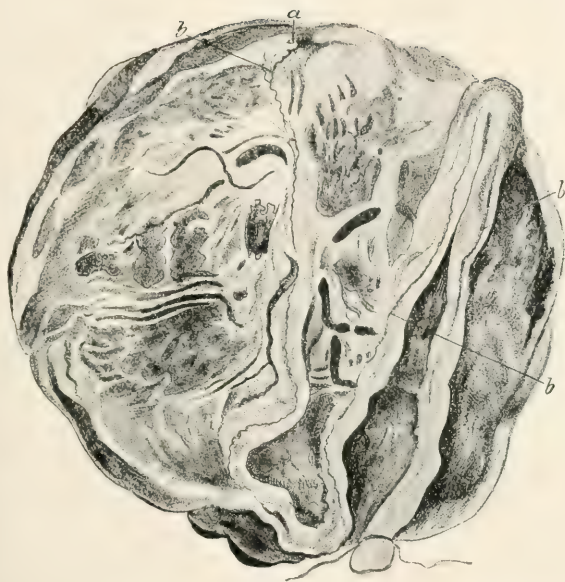
Just as it is the placenta which to a large extent impresses on fetal pathology its peculiar characters, so the presence of the amnion accounts for much in embryonic pathology, although the allantois and umbilical vesicle doubtless play a part in producing malformations. One of the earliest phenomena in embryology is the development of the extra-embryonic somatopleure to form the amnion, and anything which interferes with its evolution will disturb growth. Probably defects of the head- and tail-folds explain anencephaly, spina bifida, and symphodia. Delayed separation of the amnion from the body of the embryo, as in cases of absence of the liquor amnii, will result in pressure, and this will arrest development in the stage then reached, while the other parts will go on developing. In some such way exomphalos will be produced. Fusion of neighboring parts will be caused by continued pressure. In this way we get the sireniform fetus. The morbid changes which result from death of the embryo are also determined by the nature of the organism. Maceration is characteristic of the fetus, but dissolution and mummification mark embryonic death. There are some grounds for supposing that the embryo may die and the rest of the blastodermic vesicle go on growing. Curious forms of abortion-sac are thus produced, in which no embryo at all, or only a stunted nodular embryo, is found. The passage from the embryonic economy to the fetal is accompanied by great destruction of embryos, explaining in some measure the frequency of abortion at the second and third months. It is not always possible to distinguish between a disease and a monstrosity, because the whole organism does not pass out of the embryonic into the fetal stage at the same time—for example, the limb-buds, which are still embryonic when most of the internal organs are in the fetal stage. A morbid cause acting upon two parts of the organism may therefore produce a disease in the one and a deformity in the other. This is one reason why the so-called fetal bone-diseases and the malformations of the limbs are so difficult to understand. Sharply defined morbid conditions cannot always be found either in antenatal or in postnatal existence.

As to the pathology of germinal life, Ballantyne points out how little is certainly known of this. The great phenomenon of germinal life is impregnation, with its antecedent phenomena of maturation and polar extrusion, and its subsequent phenomena of nuclear division and the formation of the morula-mass. Morbid changes at this stage will cause a disturbance of the normal progress of the phenomena of impregnation and segmentation. Reference is made to the experiments of Hertwig, Chabry and Roux, and others, showing that monstrosities can be caused by traumatic or toxic agencies during the segmentation of the ovum of ascidians and echinodermata, and the well-known placental parasites are possibly due to a similar cause. Double monsters are regarded by many as due to polyspermy, or the entrance of more than one spermatozoon into the ovum. It is possible also that such puzzling structures as dermoid cysts may originate in the absence of the normal male element. It is noted that monstrosities by defect are characteristic of embryonic pathology; monstrosities by excess belong to germinal pathology. The conclusion seems to be warranted that the same morbid causes—toxic, microbic, traumatic—are at work in the germinal as in the other epochs of antenatal and postnatal life.

The Occurrence of a Vitelline Placenta in the Human Subject.
—J. W. Ballantyne¹ remarks that teratologic phenomena have often found

¹ *Lancet*, Feb. 5, 1898.

PLATE I.



Placenta with persistent umbilical vesicle (*a*) and omphalomesenteric vessels (*b*, *b*, *b*)
(Ballantyne).

a ready explanation in the facts of embryology; and, conversely, instances are not wanting in which knowledge of embryologic processes has received enlightenment from the study of conditions which are manifestly abnormal. From the examination of a sireniform fetus a teratologic sidelight is thrown upon the development of the human placenta. The fetus was born at full time of the third pregnancy of the mother. The child presented by the lower extremity. The placenta and membranes were adherent, but were unfortunately not kept for examination, but did not, according to the medical attendant, appear to be abnormal. The fetus, whose sex was not evident externally, weighed 2902 grm. and had a total length of 50 cm. The head was disproportionately larger than the other parts; and the girth of the body in the abdominal and pelvic regions was much less than normal. The fetus had a steadily diminishing circumference from the umbilicus downward. The lower limbs were united into one appendage, resembling somewhat the tail of the mythical mermaid. The fused foot was divided on the sole by a deep groove into 2 parts, one carrying 2 large toes, while the other had 4 smaller ones attached to it. There were 1 bone in the thigh and 2 in the leg. The hip-joint seemed mesial in position. The umbilical cord had only 2 vessels—an artery and a vein. The vein passed upward and entered a tunnel in the liver, between the right and left lobes, and therein seemed to break up in the hepatic substance. The artery originated from the abdominal aorta, about the level of the second or third lumbar vertebra, and, carrying with it a fold of peritoneum, passed directly forward in the middle line of the body to the anterior abdominal wall, which it reached a little above the symphysis pubis. It then turned upward for about 2 cm. to reach the umbilicus. It thus slung a diaphragm of peritoneum right across the abdomen, a little above the plane of the pelvic brim, and so shut off the abdominal from the pelvic cavity. Abdominal testicles were found, but no trace of urinary bladder, ureters, urachus, or hypogastric arteries. The kidneys were small, flattened, and rudimentary. The aorta, after giving off the umbilical artery, passed as a much smaller vessel into the pelvis, where it gave off lateral branches. Ballantyne gives the results of an exhaustive research into all the reported cases of symphidia. In all, about 120 cases of this monstrosity have been recorded. In only 11 was any allusion made to the placenta. He discusses in detail the results of this research, as well as the comparative embryology of the placenta, and arrives at the following general conclusions: 1. In the symphidial fetus it is common to find in association with a functionally adequate placenta the absence of allantoic derivatives and vessels, and of the structure from which the allantois itself is derived, and the presence of vessels (usually an artery and a vein) in the umbilical cord which appear to be the persistent omphalomesenteric cord or vitelline vessels. 2. It may therefore be regarded as probable that the fetal part of the placenta has in these cases been vascularized by the vitelline instead of the allantoic circulation. 3. This conclusion is supported by the following additional evidence: *a.* The commonly accepted theory of origin of symphidia is pressure (probably amniotic in nature) acting upon the tail-end of the embryo and causing defective development of the parts situated there, including, of course, the allantois and its vessels; in this fact may lie the explanation of the absence of the allantoic derivatives. *b.* The omphalomesenteric vessels may persist (alongside of the allantoic) till the full term of pregnancy, keeping pace with the normal growth of the umbilical cord, and may then be found to contain blood, showing that they are still functionally active. *c.* In other forms of monstrosity (*e.g.*, exomphalos, placental parasitism) there is evidence of the development of the placenta by means

of the vitelline vessels. *d.* In 3 of the orders of placental mammalia which resemble the human subject in the possession of a discoid placenta—viz., rodentia, cheiroptera, and insectivora—there is absolute proof of the normal occurrence of a temporary and provisional vitelline or yolk-sac placenta, replaced later by an allantoic one; in animals below the placental mammals there is some evidence of the absorption of nourishment from the mother by means of a rudimentary vitelline pseudoplacenta. *e.* Recent researches in human embryology have tended to show that the fetal placenta is not so exclusively “the organ of the allantois” as was at one time supposed; it may also be that the allantoic vessels are not absolutely necessary for vascularization. 4. The vitelline placenta in sympodial fetuses (and in some other forms of terata) may represent a reversion to the type of placenta-formation in the hedge-hog, or even to that of pseudoplacenta in the marsupials and others still lower in the scale. In this case an arrangement temporary in character in the animal has become permanent in the malformed human fetus. On the other hand, it may yet be shown that early human embryos possess normally a preliminary union between vitelline vessels and omphaloidean trophoblast, in which case the vitelline placenta of sympodia is an arrest of development—a condition normally temporary in the human subject has become permanent.

Berry Hart could not agree with the conclusions of the paper. Of course, the normal placenta is not vitelline, and Ballantyne assumed that it was allantoic. Hart believed the normal placenta to be an organ of the chorion. The placenta could be vascularized by the vessels of the vitellus. The placenta must have an epiblastic covering to form the epithelium to cover the villi, but the vitellus has no epiblast, being composed only of meso- and hypo-blast.

Monstrosities.—Interesting cases are recorded as follows: Georghin,¹ a case of sternopagus; H. Spencer,² a sireniform monster; Pinard and Varnier,³ a symelian monstrosity; F. L. Glenn,⁴ a case of syncephalus; M. H. Fussell,⁵ a case of otocephalus; H. Gerz,⁶ an omphalopagic fetus; C. Stewart,⁷ a polymelian canine monstrosity; W. H. Peplar,⁸ a dicephalous monster; A. C. Jacobson,⁹ a fetus amorphus; H. Meunier,¹⁰ a case of amelia; and E. W. Clarke,¹¹ a case of craniorachischisis.

G. Giglio¹² writes upon the antenatal diagnosis of anencephaly and derencephaly. He says that in most instances the diagnosis of the presence of a monstrosity before birth is a matter of probability only. Hydramnios, serous infiltration of subcutaneous tissue, the transitory presence of albuminoid principles in the urine, and irregularity in the fetal movements, together with the history of syphilis and preexisting renal disorders, all help to constitute a diagnosis of probability. Giglio, however, points out that in the case of brainless fetuses, with or without the spinal cord, another symptom can be elicited which will aid diagnosis. This is the character of the fetal heart-sounds, which are weak and uncertain, now with long intervals and again in rapid succession. Auscultation generally leaves a doubt as to the existence of the sounds. This peculiarity is ascribed to defective innervation of the fetal heart in such monstrosities, for even if the cardiac plexuses and their branches exist, the cerebral centers, and generally also the spinal ones, are certainly absent. This symptom, in conjunction with careful abdominal palpation, which reveals the

¹ Jour. de Méd. de Paris, June 5, 1898.

² Ann. de Gynéc., xlviii., 146, Aug., 1897.

³ Ann. of Gyn. and Pediat., Feb., 1898.

⁴ Lancet, Jan. 1, 1898.

⁵ Brooklyn Med. Jour., Aug., 1897.

⁶ Quart. Med. Jour., Apr. 1898.

⁷ Arch. of Pediatrics, Feb., 1898.

⁸ Chicago Clinic, Apr., 1898.

⁹ Indian Med. Jour., Sept., 1897.

¹⁰ Canad. Pract., Apr., 1898.

¹¹ Bull. de la Soc. anat. de Paris, 58, xi., 202, 1897.

¹² Ann. di Ost. e Gin., xix., 328, 1897.

PLATE 2.



Sireniform fetus, anterior aspect (Ballantyne).



PLATE 3.



FIG. 1.—Otocephalic monster, showing mouth-cavity and ear (Fussell).



FIG. 2.—Otocephalic monster, showing single orbit and mouth (Fussell).

absence of the cranial vault, will be of great service in the antenatal diagnosis of the anencephalic monstrosity. [The Italian school of observers deserves great credit for its strenuous efforts in the direction of the establishment of the principles of diagnosis of monstrosities still *in utero*. Villa, La Torre, Calderini, and Giglio himself have all made advances in this department of teratology.]

THE PATHOLOGY OF PREGNANCY.

The Pernicious Vomiting of Pregnancy.—W. S. Gordon¹ suggests that the essential causes of this condition may be found in the impoverishment of the maternal nervous system by the withdrawal of phosphorus for the growth of the uterus and its contents. The decreased elimination of phosphorus by the kidneys is an interesting fact. That the crystals precipitated by Tessier's fluid in the urine during early pregnancy may be imperfectly formed because of a deficiency of phosphoric acid is not to be denied. This irregularity is not, however, pathognomonic of pregnancy, but the same will be found in other conditions—such as nephritis—characterized by deficient excretion of phosphoric acid. The hypophosphite of calcium and sodium is recommended for the condition. Antonchevitch² sees a strict homology between the uncontrollable vomiting of pregnancy and the vomiting from which animals suffer when deprived of salt in their food, being fed on albumin artificially deprived, as much as possible, of potassium and sodium salts. He has therefore dieted women suffering from hyperemesis gravidarum by taking care that their food contains at least a full proportion of salts.

Arthur Giles³ has analyzed the causation of ordinary vomiting of pregnancy, to get some light on the pernicious form. He regards both conditions as due to exaggeration of one or other of three factors which are present—namely: 1. The exalted nervous tension of pregnancy. 2. A source of peripheral irritation—the expanding uterus. 3. An easy channel of outlet for nervous disturbance—the vagus. Treatment should be directed primarily to the parts concerned. J. Geoffroy⁴ states that the vomiting is caused by reflex contraction of parts of the alimentary canal, pylorus, or duodenum, secondary to contraction and hyperesthesia of the ilio pelvic angle of the colon. Prolonged palpation reveals the existence of the contraction at this spot, and is also the cure for it, rapid and certain in one to three brief *séances*. He adds several convincing observations.

Bacon⁵ defines vomitus gravidarum as “vomiting during pregnancy, due to a variety of immediate causes acting upon the abnormally irritable nervous system of the pregnant woman.” These causes may be due: (1) to an abnormal condition of the vomiting-center; (2) to sufficiently powerful impulses sent from the genital tract causing irritation of the vomiting-center; (3) to a combination of influences affecting the vomiting-center both directly and reflexly, as poison circulating in the blood or nutritive changes coexisting with peripheral irritation; (4) to a psychopathic factor like that which exists in the vomiting of hysteria. While vomiting may commence at any time after the first week of pregnancy, 70 % of all cases begin during the first month, very few developing during the fifth or sixth month. The greatest amount of sickness exists during the second month. Vomiting does not always occur in first pregnancies; but in primipare the frequency of its appearance increases with age, so that 90 % of first cases over 25 years of age are more or less affected. Women

¹ Va. Med. Semi-monthly, Oct. 22, 1897.

² La Gynéc., Oct. 15, 1897.

³ Brit. Med. Jour., Sept. 18, 1897.

⁴ Gaz. méd. de Liège, Sept. 2, 1897.

⁵ Am. Jour. Med. Sci., June, 1898.

who menstruate regularly and without pain, and not too freely, have less sickness than those who are troubled with profuse or painful menstruation. In summing up his suggestions regarding treatment the writer says: 1. The abnormal irritability of the nervous system, including the vomiting-center, is to be allayed by keeping the patient in the horizontal position, by attention to the skin and bowels and kidneys, using rectal and, if necessary, hypodermic injections of salt solution. 2. The hysteric condition which is so commonly found present should be controlled by strengthening the will and influencing the dominant idea of the patient. 3. All sources of peripheral irritation should be discovered and treated. 4. In extreme cases subcutaneous saline injections serve the threefold purpose of (*a*) diluting the blood and increasing vascular tension; (*b*) eliminating toxins through renal and intestinal emunctories; (*c*) furnishing two most important kinds of food. 5. Induction of abortion is never indicated. At a stage when it is safe and efficient it is not necessary; and in extreme cases it adds greatly to the danger, rarely stops the vomiting, and can be substituted by the artificial serum.

[In the treatment of pernicious vomiting oxygenated water and cocain have commanded considerable attention of late.] As to the former, Gallois and Bonnel¹ reported to the Société de Thérapeutique the results of this treatment. Hayem and Pinard had advised inhalations of oxygen for the same purpose; but as the oxygen could not always be procured in gaseous form, they tried water containing 10 or more volumes of oxygen gas (peroxid of hydrogen, H_2O_2). They administered a tablespoonful in a liter of water, given with wine and drunk during meals. They note that 2 tablespoonfuls of oxygenated water to the liter lead to an unpleasant metallic taste. They do not think the cure results from suggestion, because it did not follow when the dose employed was a teaspoonful to the liter. As a rule, cure is complete in 2 or 3 days. Vomiting due to gastric disease is not improved; nor has the treatment any effect on heartburn. In cases of pure vomiting of pregnancy they had only 2 failures. The method was also tried with success in the vomiting of phthisis. In 5 cases of the vomiting of pregnancy in which morphin injections and cocain given by the mouth had failed, Tibone was able to effect an immediate cure by means of hypodermic injections of cocain hydrochlorid. One-seventh of a grain was thus administered just before food was taken, the puncture being made in the epigastrium, and the injection repeated 2 or 3 times a day. It was found that this enabled the patients to retain their meals; and they increased in weight and their condition improved in a marked degree, no unpleasant effect on the pulse, the respiration, or the temperature being observed in any of the cases. As soon as possible the cocain was stopped, and the vomiting did not show any tendency to return.

Salivation of Pregnancy.—J. C. Simpson² says that while the vomiting of pregnancy is usually preceded by a flow of saliva in the mouth in common with ordinary vomiting, in certain cases the amount and the persistence of the salivation are independent phenomena. Ludwig says the saliva is really secreted from lymph present in the lymph-spaces of the gland. Thus we may have secretion without a blood-stream through the gland. It is important to note that the secretion of saliva is not a mere process of filtration, such as perhaps occurs in the glomeruli of the kidney. The amount of saliva secreted by some pregnant women may reach many quarts in 24 hours. This condition is most common during the early months of pregnancy, but may persist all through gestation. The hypersecretion of pregnancy contains no ptyalin and a smaller amount of sodium salts than normal saliva, resem-

¹ Bull. gén. de Thérap., Mar. 23, 1898.

² Lancet, July 10, 1897.

bling what is called "chorda saliva" rather than the result of sympathetic stimulation. According to Bouehard, one of the toxic principles in normal urine is a sialagogue; experiments with ordinary urine do not produce this effect, as the total quantity of urine sufficient to kill does not contain the sialagogue in sufficient quantity to produce its physiologic effect; but if urine deprived of part of its toxicity, as by decoloration, be injected, salivation is produced. This toxin is found in greater quantities in the blood, liver, and muscles than in the urine. Its chemical nature is unknown; nor has it received a name. The intravenous injection of an alcoholic extract of normal urine produces in rabbits salivation, during the comatose state that lasts for 45 minutes, equal to that produced by jaborandi. Alcoholic extract of blood produces rapid salivation, together with muscular weakness and convulsions. As this toxin is found in the blood, liver, and muscles, it is probable that it is from the blood that the kidneys derive the substance which causes salivation.

Nervous Diarrhea in Pregnancy.—Condio¹ has published a monograph on an interesting complication which he considers to be related to hyperemesis gravidarum. While the latter is more frequent in the higher ranks of life, diarrhea seems commoner among poor pregnant women. Obstetricians note its occurrence in lying-in hospitals in cities where it is hardly ever seen in private practice. Out of 3674 pregnant women in the Turin Maternity, nervous diarrhea was observed in 35. No fewer than 21 of these cases occurred in primiparae. Temperature has little influence on this affection; but errors of diet are more probably among its causes. Nervous diarrhea begins about the fifth month, and may become formidable; it has been found to continue even in childbed. Nerve-tonics are indicated, and, as in hyperemesis, premature labor must be induced if the diarrhea persists and the patient becomes seriously debilitated.

Valvular Cardiac Disease.—Kisch² discusses the question, "When may women with heart-disease marry?" He does not agree with Peter's dictum: "*Fille pas de mariage, femme pas de grossesse, mère pas d'allaitement.*" Every case, however, must be decided on its merits. The chief points to be considered are: (1) the kind of heart-disease, (2) its duration, (3) the presence or absence of compensation, (4) the general health, (5) the social position of the patient. (a) Women may marry if the disease is not of long standing and compensation is good, and the general health not undermined. They will have during pregnancy, and still more during and for a time after delivery, many troubles due to their hearts; but in by far the greater number of cases there will be no danger to life. This applies to well-compensated mitral regurgitation and stenosis, aortic regurgitation, fairly marked sequelæ of pericarditis, and to muscular degeneration, if not too far advanced. The patients must also be in a position to spare themselves bodily exertion as much as possible during pregnancy, to avoid mental excitement, and to have constant medical supervision. (b) The prognosis is not so good if the patients are very anemic or nervous or are advanced in years, or if the valvular disease is congenital or acquired in childhood. In these cases the physician should advise against marriage, or at any rate point out that the disease will almost certainly become worse after marriage. (c) Marriage is to be absolutely forbidden as dangerous to life when compensation is failing or when there is advanced muscular degeneration. In all cases in which there are dyspnea, palpitation, and a quickened pulse on slight exertion, or marked edema not disappearing after rest in bed, when there is a tendency to arrhythmia, scanty urine with albumin, and attacks with irregular small pulse, coldness of the extrem-

¹ Centralbl. f. Gynäk., No. 29, 1897.

² Therap. Monats., Feb., 1898.

ities, nausea, dyspnea and syncope, marriage is dangerous, whether the cause of the symptoms be valvular disease, or diseased arteries or cardiac muscles. Even those for whom marriage is allowable must follow certain rules strictly: (1) Coitus must not be frequent, and must be continued to the end of the orgasm, otherwise reflex heart-troubles and depression result. (2) They must not have more than one or two children, as the strength of a diseased heart diminishes in geometric progression with each pregnancy. If this rule is followed, induction of premature labor will be seldom necessary, since when it is the results are very unfavorable.

Albuminuria and Nephritis in Pregnancy.—In writing on the toxemia of pregnancy, Kynoch¹ defines it as that condition which occurs as the result of the presence in excess of toxic material, and, so far as is known, the poison is of the nature of an alkaloid or alkaloids. The excretion of waste-material is mainly effected through the kidneys, and this may account for the albuminuria of pregnancy, rather than mechanical pressure or reflex spasm. Many obstetricians now believe that the theories already advanced to explain eclampsia do not cover all cases, and therefore they accept the toxic theory as a substitute. They consider that the convulsions arise from the action on the nerve-centers of a poison which is the result of tissue-metabolism elaborated partly by the mother and partly by the child. Chambrelent's experiments proving the increased toxicity of the blood in eclamptic convulsions, and the diminished mortality as the result of treatment based on this theory, are in favor of the correctness of the theory. E. H. Douty² concludes that albuminuria appearing primarily in pregnancy may arise from: 1. Pressure on the renal veins or other vessels. 2. Pressure on the ureters. 3. Increased work of the kidney, due to the excretion of the waste-products of the fetus, and enlarged uterus. 4. The generally increased arterial tension which is usual in pregnancy. 5. A reflex influence starting from the pregnant uterus as a source of irritation, and disturbing the circulation or the secretions of the kidney as those of the salivary and of the thyroid glands are in some cases disturbed. 6. The presence of a specific germ. In cases in which the kidney-trouble is of long standing and the albuminuria amounts to one-third, together with some edema, pregnancy should be at once terminated for the woman's sake, especially since the chance of a living child is very small, as premature labor almost certainly occurs. When, however, there is merely a temporary disturbance of the kidneys and their vascular system the chances for mother and child are considered better, and pregnancy may be allowed to proceed.

Charles³ concludes that in most pregnant women there is a certain degree of autointoxication, the normal toxemia of pregnancy. In lesions or disease of the kidney or liver the toxic condition becomes aggravated, and may lead to grave complications, notably uremia. Toxemia of renal origin is the most common, associated with albuminuria and edema. The albuminuria is not the cause of eclampsia, but a symptom having a common origin, and grave complications, such as coma, dyspnea, or paralysis, may prove fatal in the absence of eclampsia. One pregnant woman in 40 is albuminuric, and 1 albuminuric in 4 develops eclampsia.

Blaudeau⁴ publishes information of much importance as to albuminuria in past pregnancies, and the prognosis if the patient should again conceive. Altogether, albuminuria in pregnancy seems to prevail most in first, second and third gestations, becoming rarer in multipare. Blaudeau has worked in

¹ Brit. Med. Jour., May 21, 1898.

³ Jour. d'Accouch., Apr. 3, 1898.

² Am. Gyn. and Obst. Jour., Feb., 1897.

⁴ Thèse de Paris, 1897.

the Baudelocque Clinic for the last two and a half years for the necessary statistics. He came upon 23 cases of pregnant multiparæ who had suffered from albuminuria in earlier gestations. In 13 not a trace of albumin could be found in their urine, which was repeatedly examined; 3 out of the 13 had convulsions in previous pregnancies; 1 of the 3, indeed, had 11 eclamptic attacks in an early labor, yet when again gravid, some 18 months later, neither albuminuria nor eclampsia occurred. In 8 of the total 23 albuminuria recurred, but in a milder form; whilst the infants were stronger than their elder brothers. In 2 only of the 23 was the albuminuria worse than in earlier pregnancies; 1 had eclampsia and 1 was prematurely delivered of a macerated fetus.

Pyelonephritis of Pregnancy.—Navas¹ has observed this complication 11 times, and believes that it is frequent. Many cases taken for cystitis should come under this class. The symptoms are seldom observed till the later months of pregnancy; as a rule, the fifth, sixth, and seventh; never before the fifth. The disease is clearly caused by compression of the ureters and infection of the kidney, already congested and damaged by retention of urine in its pelvis. Infection is favored by fatigue, cold, and overwork, and enters the kidney through the blood, so that it descends the urinary tract. The *Bacillus coli* is the germ usually detected, and is probably due to constipation. The symptoms show no special character unless one or both of the 2 abortions in the 11 cases were the direct result of the renal complication. The prognosis, according to Navas, is fairly favorable for mother and child; but he admits that 2 of the 11 mothers died after delivery. It was among the remaining 9 that the 2 abortions occurred. After childbirth the disease can readily be cured by simple medical treatment.

Appendicitis during and after Pregnancy.—Vinay² records 4 cases of appendicitis in pregnancy, and refers to a total of 32 cases. The comparatively small number tends to show that pregnancy does not set up torsion of the appendix or colitis, conditions which would increase the virulence of the colon-bacillus and so induce appendicitis. In the 32 cases there were 10 deaths, a percentage of 31, which is much higher than that of Armstrong in his series of 517 cases, with a mortality of 12.8%. The only complication of importance in appendicitis occurring during pregnancy is abortion, which was noted in 40%; this accounts for the fact that in half the 32 cases the children died. This frequency of abortion is much above that seen in other infectious diseases, and is referred to the intimate vascular and lymphatic connections existing between the appendix and the uterine adnexa. Clado described an appendicular ovarian peritoneal fold as being constantly present, and considers that this carries the lymphatics from one to the other. Lafforgue, however, finds it in only 20% of bodies examined. In 2 of Vinay's 4 cases the appendicitis was primary; but in the other 2 the appendicitis was due to spread of the infection from the uterus. In the first there was postpuerperal infection, which lighted up old appendicular mischief. The appendix was resected, and the right tube and ovary appeared healthy. In the other case, a primipara with a history of membranous colitis, there was hemorrhagic metritis, due to retention of placental tissue, with subsequent appendicitis. The differential diagnosis of appendicitis during pregnancy from tubal gestation on the right side is not difficult, but it is less easy to distinguish it from right salpingitis complicating pregnancy. Appendicitis during pregnancy should be treated like ordinary appendicitis. Pinard³ has collected 45 cases

¹ Rev. Obstét. internat., May 21, 1897.

² Lyon méd., Jan. 2, 1898.

³ Sem. méd., Mar. 28, 1898.

of appendicitis complicating pregnancy, the diagnosis being confirmed in 30 by operation or postmortem. He concludes from these that: (1) Appendicitis may attack a pregnant woman at the beginning or at any time during pregnancy or the puerperium. (2) In most cases it causes abortion. The child dies, as a rule, very rapidly, as the author's case proves, from infection. (3) It is only possible to save both the mother and child when the abscess is limited and encysted. (4) Every type of appendicitis may occur. (5) The diagnosis may be difficult, owing to the enlarged uterus, or still more so during the puerperium, but is usually possible with care. (6) Treatment consists in operating as early as possible. Induction of premature labor is unjustifiable, since pregnancy is not always interrupted if the mother recovers. (7) Prophylaxis consists in operating in every case of relapsing appendicitis in a young girl or nonpregnant woman, during the period of sexual activity, to prevent future complications during pregnancy.

Syphilis in Pregnancy.—Murray¹ quotes Fournier and Le Pileur as to the results of pregnancy in syphilitic mothers. Fournier's figures are 167 pregnancies, of which only 22 infants survived, the rest being either abortions, stillbirths, or early deaths. Le Pileur quotes 414 pregnancies, with 295 deaths. Murray divides syphilis in pregnant women thus: (1) That acquired before pregnancy, in which there is nothing abnormal; (2) infection from a primary chancre of the father at a fruitful coitus, in which the primary sore in the mother appears earlier than in unimpregnated women and is more severe, this form of infection being most fatal to the child; (3) infection from a secondary lesion in the father, which, if it occurs in the earlier months of pregnancy, usually kills the child; if in the later months, there is less danger to the child; (4) syphilis in both parents, where the effect on the child is the worst. With regard to the diagnosis this is often difficult, since the primary sore is often not seen. An examination of the husband should be made whenever possible. If the husband, thinking he is cured, having had no symptoms for some time, impregnates his wife, the disease usually appears in the third month. As regards treatment, Murray prefers inunction combined with tonics, such as iron, arsenic, and strychnin. After birth the child should be treated through the milk by treating the mother with mercury. As the child grows older it is enough to place mercurial ointment on a flannel binder. If the mother is too weak to suckle, the child must be fed by hand, no wet-nurse being, of course, admissible.

The Neuroses in Pregnancy and Labor.—The action of hysteria, epilepsy, and chorea on pregnancy and labor is treated of by Tarnier.² He finds that hysteria is, in a small percentage of cases, favorably influenced by gestation. In a very few cases the hysteric symptoms entirely disappear during the progress of gestation, in others they are ameliorated, while in still others the hysteria becomes much more pronounced than before the pregnancy began. This latter, according to Landouzy and others, is the usual course. There is no tendency to abortion or to premature labor in pregnancy complicated by hysteria, nor is life jeopardized. The treatment consists in the exhibition of bromids. When epileptic women become pregnant, in one-half the cases the neurosis is favorably influenced by the gestation; the epileptic seizures diminish in number and in intensity. Of the remainder of the women, one-half show aggravation of the epilepsy, the spasms becoming more frequent and more severe, and even resulting fatally. In the remaining half no influence seems to be exerted either way. According to Tarnier, when improvement in the epilepsy ensues, it is the direct result of the cessation of

¹ Med. News, June 19, 1897.

² Presse méd., No. 29, 1897.

menstruation. Should an epileptic convulsion occur at labor, which is rare, it is readily controlled by inhalations of chloroform. The difficulty lies in the differentiation between epilepsy and eclampsia, and this can be determined only by careful urinary and hemic examinations. Epileptic pregnant women require potassium bromid in large daily doses (1 to 2 drams). Chorea, unlike the two preceding neuroses, is a very serious complication of pregnancy, giving a mortality of from 28% to 30%. Some of the patients die suddenly from asphyxiation, others become paralyzed, and still others maniacal. Abortion or premature labor occurs in 20%. A history of rheumatism or chorea prior to pregnancy is to be noted in many of the cases. Arsenic, quinin, and tonics constitute the treatment. Dakin¹ states that chorea is much more fatal in pregnant than in nonpregnant women. A complication which renders chorea in pregnancy especially grave is the fact that mania is so often present in these cases. This results in profound exhaustion, and greatly lessens the probability of recovering. The disease usually appears during the first 6 months; the worst cases occurring at the second, third, and fifth months. After delivery hyosein used hypodermically is more efficient than morphin.

Retrodisplacement of the Gravid Uterus.—According to A. Mantle,² Martin found in 24,000 pregnant women 121 cases of retroversion and retroflexion, and in 94 of the cases the retroversion persisted after repeated pregnancies. Some have thought that by the gradual development of the uterus pressure is exerted on the neck of the bladder, and that in consequence of difficulty in passing urine the bladder becomes distended. The fundus uteri becoming more and more pushed backward, complete retroversion results. Another cause of retroversion is said to be a large pelvis with a deeply concave sacrum, and relaxed supports are said to favor the condition in multiparæ, the uterus, through its increased weight, becoming top-heavy and easily turned back. Undoubtedly, the uterus held down by old adhesions, the result of some inflammatory process, is a cause of retroversion and incarceration in some cases. In case incarceration occurs, Jacobs³ advises the performance of abdominal section.

Carcinoma of the Cervix during Pregnancy.—Fehling⁴ has observed 5 cases of cancer in 3000 pregnant women. It is much less common than myoma in pregnancy. As regards treatment, he advises extirpation through the vagina in the early months of pregnancy. In the later months he would perform Cesarean operation, remove the child, amputate the uterus, and remove the cervix through the vagina. Total extirpation of the uterus following abdominal incision has not been successful in his experience. When the cancer is so far advanced that it cannot be removed, Cesarean section should be performed in the interest of the child only. Olshausen⁵ gives the results of his experience in cancer of the uterus complicating pregnancy. In the matter of diagnosis he calls attention to the irregular bleeding which occurs in cancer, and which may obscure the diagnosis of pregnancy. The shape of the body of the uterus can usually be outlined, and this should make a diagnosis of pregnancy evident. In considering the treatment, one must remember that carcinoma grows with frightful rapidity in the pregnant or puerperal patient. For this reason radical operation should be resorted to as soon as a diagnosis is made. As regards prognosis, cases are reported free from disease from 3 to 8 years after operation. Olshausen operated upon 9 cases up to the end of 1895: 1 died 6 months after operation, from an unknown cause; in 4 the dis-

¹ Practitioner, Dec. 1897.

² Quart. Med. Jour., July, 1897.

³ Jour. d'Accouch., Apr. 10, 1898.

⁴ Münch. med. Woch., No. 47, 1897.

⁵ Zeit. f. Geb. u. Gynäk., Band xxxvii., Heft 1, 1897.

case returned at intervals varying from 5 months to $3\frac{1}{2}$ years; 4 remain well from $2\frac{1}{2}$ to $7\frac{1}{2}$ years after operation. As regards treatment, 4 methods of operating are available. The first is total extirpation of the pregnant uterus through the vagina; second is extirpation of the uterus through the vagina after the womb has been emptied; third is total extirpation of the pregnant uterus, which is cancerous, through the abdomen; and fourth is Cesarean section, with or without extirpation of the uterus afterward. Olshausen concludes that in the early months of pregnancy the cancerous uterus should be removed through the vagina. Most writers think that it is impossible to operate in this manner after the fourth month. In one case, however, Olshausen operated successfully at the fifth month, and in another toward the end of the sixth. The results of this operation are good. Olshausen reports 4 cases in which abortion was first produced, and afterward the uterus extirpated through the vagina. Each of these cases made a good recovery. He allowed from 8 to 10 days to elapse after the abortion before removing the uterus. He also reports 4 cases in which the uterus was extirpated through the vagina after spontaneous birth or abortion. These patients also did well. As regards amputation of the pregnant uterus through the abdomen, and extirpation of the cervix afterward through the vagina, Olshausen is not in favor of that procedure. He considers the risk of infection greater, and the probability of return also greater. In 2 cases Cesarean section was performed. In one instance the mother died 6 months afterward of cancer, while in the other septic infection and death occurred 5 days after operation. In conclusion, Olshausen urges in cases requiring Cesarean section, that the womb be closed by suture and then extirpated through the vagina.

Fibroid Tumor in Pregnancy.—E. L. Call¹ has tabulated 77 cases. Of these, 12, or 15.6%, passed through an uncomplicated delivery at term, with recovery of the mother and a living child. Of the 65 abnormal cases there were 7 spontaneous abortions, presumably caused by the presence of the fibroid, 5 induced abortions or premature labors, 8 hysterectomies in the early months, 1 spontaneous rupture of the uterus at the fourth month, and 1 premature labor at 7 months. Of 52 cases in which the labor was at term, there were 12 normal and 40 complicated; and in the latter were reported 2 Cesarean sections, 1 Porro, 3 craniotomies, 6 versions, 8 breech (with manual delivery), 13 forceps, 5 enucleation of the tumor during labor. Regarding the position of these tumors, there were 21 in the anterior wall, 17 in the posterior wall, 25 at or near the fundus, 8 cervical, 9 submucous, and 13 not located. In 32 cases, 41.5%, both mother and child survived; 23 mothers lived, the children being stillborn. Thus, 55 mothers, or 72+, recovered. Of the children, 36 were born alive, 21 were nonviable at birth, 15 died during labor; in 2 cases the fate of the child is not mentioned, while 1 case had not been delivered at the time of record. This gives a mortality of 50%.

Keiffer² concludes that hysterectomy in fibroid uteri in pregnant patients is demanded for 4 indications: (1) When, independently of pregnancy, the fibroid tumor would make hysterectomy justifiable; (2) when the fibroid occupies such a position that labor would be impossible; (3) when the tumor is degenerating or suppurating, and when a retained placenta complicates the case; (4) hysterectomy should be performed in a case of labor complicated by fibroid tumor of the uterus after the child has been extracted by Cesarean section.

Ovarian Tumors in Pregnancy.—J. Williams³ remarks that the influence of ovarian tumor on pregnancy is marked, abortion or premature labor

¹ Boston M. and S. Jour., June 16, 1898.

² Gaz. hebdom. de Méd. et de Chir., No. 34, 1897.

³ Brit. Med. Jour., ii., 102, 1897.

occurring in about 19% ; while various accidents, such as twisting of the pedicle, rupture of the cyst, hemorrhage into and suppuration in the cyst, may be caused by gestation. The part played by the growth in labor is mainly mechanical ; a large growth impedes the auxiliary forces and interferes with cardiac and respiratory action, if situated in the abdomen ; while if situated in the pelvis, it presents a formidable obstacle to delivery, and is the chief cause of the high mortality (25%) following this complication. The diminution of the enormous mortality can only be effected, in his opinion, in 2 ways : (1) by the removal of the tumor during pregnancy or labor ; (2) by Cesarean section. Small tumors not occupying the pelvis, and those capable of being pushed up into the abdominal cavity, might be left, and will probably cause few symptoms ; all others should be operated on, and Cesarean section reserved for cases in which the tumor is found to be impacted in the pelvis by strong adhesions. Austin Cheney¹ mentions that Remy states that in 321 cases collected by him, abortion occurred 55 times. This is a higher proportion than that given by Williams. At the same time, he states that the existence of an ovarian tumor with pregnancy is of comparative rarity, and remarks on the dangers to the patient caused by accidents to the tumor, and also from intestinal obstruction caused by pressure. He points out the risks arising from traction on the pedicle and stretching of adhesions. He quotes Gordon's² collection of 204 ovariectomies at different periods of gestation : in 21, in which the mothers all recovered, the influence on labor is not stated ; in 7 cases the uterus was injured, twice causing death. Of the remaining 176 cases, 93.2% recovered, and 6.8% died ; in 69.4% labor took place at term, while in 22% premature labor followed the operation ; but as premature termination of pregnancy occurred in 17% of the cases quoted by Remy and in 12% of those quoted by Williams, when no operation was performed, the tendency to miscarriage after operation does not seem so serious ; while if to this is added the enormous fetal mortality of cases not operated on, the chances of a normal labor at term and of a living child are greatly increased by operation and removal of the growth during pregnancy. As compared with the results either of unassisted labor or labor where various obstetric operations have to be performed to effect delivery, the mortality after ovariectomy during pregnancy is not so much higher than the uncomplicated operations.

The same subject is very fully dealt with by McKerron,³ who has collated a large number of cases of this complication. He directed his attention solely to those cases in which the presence of the tumor was detected after the onset of labor and the tumor was found to occupy the pelvic cavity. The results of his investigations are very striking, the mortality following this complication being no less than 31% in all recorded cases. The mortality has, however, diminished very largely during the last 20 years : 48 cases of this complication have been recorded, with a maternal mortality of 6, or 12.5%, and a fetal mortality of 36%. The diminution of the mortality in the case of both mothers and children is nearly the same, and although one would at first sight attribute this to improved antiseptic measures, this is only likely to affect the maternal mortality, and the diminution of the fetal mortality should evidently be more properly referred to the earlier commencement of appropriate treatment. He shows that in 34 of the later cases the duration of labor averaged 24 hours ; while of 70 of the 135 earlier cases the average duration was 40 hours, showing the advantage of the abandoning of the expectant plan of

¹ Am. Jour. Obst., xxxv., 265, 1897.

² Centralbl. f. Gynäk., xviii., 566, 1894, quoted by Cheney.

³ Tr. Obst. Soc. of Lond., xxxix., 334, 1898.

treatment. Rupture of the cyst occurred in 15 cases, death resulting in 9; of 5 cases in which spontaneous rupture of the cyst occurred, 2 were fatal; in 3 cases rupture occurred during reposition, with 2 deaths; in 1 case during vaginal examination, with a fatal result; in 4 cases during extraction by forceps or version, all of these were fatal; and in 2 during craniotomy, with 1 death.

Thirty-five cases occurred in which labor was left to the natural powers; of these, 19 are described as cystic, 1 as a colloid cyst, 6 as dermoids, 2 as carcinomata, 2 as malignant. Of the 19 cases in which the tumor is described as cystic, 4 died, or 21%; of the 6 described as dermoid, 3 died, or 50%; both those described as malignant ended fatally, as did one of the 2 described as carcinoma. Forty-one cases are described in which reposition was effected before delivery, and of these 6 died; but 3 of these deaths were due to other causes. Forty-three cases were treated by puncture or incision; 7 of these died. The tumor is described as dermoid in 3; in 1 of the cases death was due to eclampsia, so that, being excluded, the mortality appears to be 6, or 14%; 17 cases were treated by version—of these, 6 died, or 30%; and 14 were delivered by forceps, and of these, 8 died, or 57%; in 4 of these rupture of the cyst occurred, and in 1 twisting of the pedicle; 18 cases were treated by craniotomy; of these, 8 died, or 44%. Three of the cysts were dermoid, 1 a fibroma, and 1 malignant. Ten cases were delivered by Cesarean section; of these, 8, or 80%, died; but it should be noted that the 2 recoveries occurred in cases operated on since 1894. Three of the cysts were dermoid, 2 were fibromata, 1 a cystosarcoma, 1 a colloid cyst, and 1 carcinoma. Two cases were treated by abdominal ovariectomy, both recovered; and 3 by vaginal ovariectomy, and all recovered; in 1 of the cases of abdominal ovariectomy the cyst was found to be colloid, and in 1 of the cases of vaginal ovariectomy a cystic adenoma was found.

Gottschalk¹ states that it is becoming comparatively rare to meet with **ovarian tumors in the puerperal state**, owing to the greater readiness with which ovariectomy is performed nowadays, on the discovery of the tumor during pregnancy, and that only those cases in which the tumor has escaped notice during pregnancy come under the care of the surgeon during the puerperal state—that is, excepting those in which the tumor has been purposely left. The fatality attending the old methods of treatment can be traced, either directly or indirectly, to septic changes in the cyst and its contents, or to rupture of the cyst. [The obstacle to labor caused by the presence in the pelvis of an ovarian tumor is one of the most serious complications with which the accoucheur can be confronted—the mother's life being endangered, first, by the prolongation of delivery, the risk of rupture of the uterus, and the certainty of serious pressure on the tissues in their normal situation; and, secondly, by the risks produced (even when delivery is possible) by the pressure of the fetus on the tumor, with the possibility of its bursting and discharging its contents into the peritoneal cavity; of its subsequent sloughing from prolonged pressure, or of suppuration of its contents after injury. The death of the fetus from prolonged uterine action is also very probable, as is the necessity for its destruction by sacrificial operations. Tumors occupying this position are very likely by their pressure on the rectum to cause damage by bruising the walls of the bowel, and subsequent bacterial infection by the *Bacterium coli*, with the possibilities of peritonitis or suppuration in the tumor, if cystic.]

¹ Volkmann's Sammlung klin. Vortr., No. 207, 1898.

PLACENTA PRÆVIA.

Hofmeier¹ has observed that the hemorrhage occurs earlier in partial placenta prævia than in complete. In central implantation the bleeding begins only toward the close of gestation. This is explained by the fact that in partial placenta prævia the sliding of the small free portion of the placenta takes place more easily than in implantation entirely around the os internum. Schatz² regards endometritis as the commonest cause of placenta prævia. Generalized atrophy of the mucous membrane constitutes another cause, the portion of the mucous surface taking part in the development being of much larger extent than normal. As regards treatment, the following is a summary laid down by W. H. Wenning,³ in the order of time of the accident, amount of hemorrhage, and condition of the patient: (a) *Before Labor*.—1. Hemorrhage slight; rest, expectant treatment. 2. Hemorrhage moderate; tampon vagina. 3. Hemorrhage profuse; also try tampon and induce labor. (b) *In the Beginning of Labor*.—1. Hemorrhage moderate; Braxton Hicks's method, provided the obstetrician has skilled assistance at hand; otherwise tampon the cervix with the cervical bag until (c) *labor is well in progress*, then rupture the membranes and deliver by podalic version; or, if hemorrhage is arrested by the descending head, deliver by forceps or permit spontaneous expulsion, if the pains are good. At any stage, when hemorrhage is excessive or cannot otherwise be arrested, manual dilatation, followed by accouchement forcé. The tampon is *indicated*: 1. In hemorrhage toward the end of pregnancy. 2. In the beginning of labor when the os is closed. 3. In moderate dilatation of the cervix—then use cervical tampon. *Contraindicated*: 1. When dilatation is complete or nearly so. 2. When it fails to arrest hemorrhage, even when dilatation is not far advanced. Rupture of the membranes is *indicated*: 1. When the os is well dilated and either spontaneous labor or artificial delivery may occur. 2. When by this method hemorrhage is better controlled than by other means. 3. When in the absence of labor-pains it will be followed by immediate pressure of the presenting part. *Contraindicated*: 1. When the os is undilated and the pains good. 2. In faulty presentation of the fetus, unless it can be followed immediately by version. Version is *indicated*: 1. When the os will admit 2 fingers and combined version can be readily made—Braxton Hicks's method. 2. When the os is well dilated or dilatable and hemorrhage is profuse, direct or internal version. 3. In desperate cases, accouchement forcé. *Contraindicated*: 1. When with a moderately dilated os combined version cannot be skilfully made (the cervical tampon). 2. When with a well-dilated os, after rupture of the membranes, the head immediately engages in the cervix. In all cases strict supervision from the onset of labor to the end of delivery.

G. F. Blacker⁴ observes that in more severe cases of hemorrhage the Champetier de Ribes's bag may be employed in place of version by introducing it into the amniotic cavity after rupture of the membrane. Used in this way, the bag acts both as a tampon in arresting the hemorrhage by pressing the separated portion of the placenta firmly against the uterine wall, and also as a dilator of the cervical canal, and a very powerful stimulus to uterine contractions. He has treated 5 cases of placenta prævia in this way, and has collected 17 other cases similarly treated. He shows that in only 1 case did severe hemorrhage occur after the introduction of the bag; that such hemorrhage might, as a rule, be readily controlled by traction upon

¹ Sem. méd., v. 25, 1897.² Ibid.³ Am. Medico-Surg. Bull., Oct., 1897.⁴ Med. Press. and Circular, Apr. 21, 1897.

the bag; that in none of the cases was any difficulty experienced in introducing the bag, nor was any preliminary dilatation of the cervix necessary; and that the average length of time required for complete dilatation of the cervix after introduction of the bag was 5 hours and 10 minutes. Of the mothers, all recovered but 1 that died of sepsis. Of the 22 children, 14 were born alive and 8 died. Of the 14, 4 subsequently died, giving a total mortality of 54.5%. The advantages claimed for the bag are: (1) Ease and facility of introduction. (2) The certain arrest of the hemorrhage. (3) Any further hemorrhage controllable by traction upon the bag. (4) The bag and not the child's body dilates the cervical canal. (5) The ease of delivery after expulsion of the bag. (6) The fact that the bag is a very powerful stimulus to uterine action. (7) The lessened fetal mortality, as compared with the results obtained by version.

Platzer¹ presents a clinical report of 46 cases of placenta prævia. The results were as follows:

1. After expectant treatment—that is to say, by tampons or artificial rupture of the membranes (23 cases)—the mortality of the mother was 0, that of the child, 39%; really, however, only 18%, as 2 of the births were premature, and in 4 cases the child was already macerated.
2. After podalic version and spontaneous expulsion (8 cases) the mortality of the mother was 0, that of the child, excluding 2 macerated fetuses, 83%.
3. After version and immediate extraction (13 cases) the mortality of the mother was 23%, that of the child 46%. From these statistics it appears that extraction is unfavorable for the mother, and ought therefore to be rejected, even though it is somewhat more favorable for the child.

Nyhoff² thus describes his method of treating the central variety of placenta prævia. A finger is passed through the cervix as soon as dilatation begins, and an opening is made through the placenta, the amniotic sac being left intact. Through the opening thus made the amniotic bag will protrude, gradually enlarging the aperture by further tearing the placental tissue as the cervix dilates; hemorrhage is prevented partly by pressure from the liquor amnii and partly by failure of separation of the placenta from the lower uterine segment. This method, which is contraindicated in all cases of placenta prævia lateralis and when the pains are weak, offers the following advantages: (1) It does not interfere with the normal progress of labor; (2) no anesthetic is required; (3) it may be used in combination with an antiseptic vaginal tampon; (4) the child may be delivered slowly, whereby secondary hemorrhages are avoided and lacerations of the maternal soft parts not produced.

In the after-treatment of the acute anemia Hofmeier³ states that the strength of the patient must be sustained with subcutaneous injections of salt-solution, ether, or camphorated oil, and injections of stimulants.

C. S. Bacon,⁴ after considering the various indications for hypodermic injections of salt solution, gives the following details as to apparatus and method of employment: The apparatus used is a reservoir consisting of a can or bottle of enamelled ware, with a spout at the bottom of the side. To this spout is attached a rubber tube about 3 feet long and closed with a clamp. Into the other end of this tube a hypodermic needle may be inserted. In order to introduce the solution into 2 places at once, a glass Y is used, to the stem of which the tube from the bottle is attached, and to each branch smaller tubes carrying needles. The apparatus should first be sterilized by boiling. If the tubes have not come into contact with septic matter, it is sufficient to run

¹ Centralbl. f. Gynäk., Aug. 14, 1897.

³ Loc. cit.

² Pacific Med. Jour., Feb., 1898.

⁴ Medicine, 1897.

through them an antiseptic solution, followed by plenty of sterilized water. The salt solution (8:1000) is then poured into the reservoir, the injection being made on the inner side of the thighs as the most convenient place. Before introducing the needles the skin is thoroughly washed, the reservoir being then raised sufficiently to secure the necessary pressure. Constant massage is made to assist in absorption of the solution. In this way 24 to 32 oz. may be injected in 15 minutes.

Amillet¹ insists that after grave hemorrhage in pregnancy or labor a saline intravenous injection is the best method for combating acute anemia. A 1% solution of sodium chlorid is the only available mixture which has no evil influence on the corpuscles. At least 1500 to 2000 gm. must be injected. In less serious cases 200 gm. can be injected under the skin; more than 1 dose may be required. Amillet recommends an intravenous saline injection or subcutaneous injection before any obstetric operation is performed on a woman exhausted by loss of blood. When the patient has clearly been revived by these means she must, in any case, be closely watched, as sometimes the good effects do not last. The injections must be repeated, if necessary, till all danger has passed away.

ABORTION.

Syphilis as a Cause of Abortion.—The following conclusions are drawn by J. A. Suimet² from a study of the action of syphilis in causing abortion: 1. Syphilis is a powerful cause of abortion, which is due to lesion of the fetus itself or of its appendages. 2. It occurs usually toward the seventh month. The father alone being syphilitic, can transmit the syphilis to the product of conception; the latter is more liable to occur the nearer the moment of conception is to the beginning of the syphilis. 3. The mother may give birth to a syphilitic child while remaining free from syphilis. 4. When the father and mother are both syphilitic the child rarely escapes infection. 5. The mother being syphilitic before pregnancy, is the more liable to give birth to a healthy child the more ancient the syphilis. 6. The nearer the syphilis approaches the termination of pregnancy the greater opportunity the child has to escape infection. 7. The child born of a syphilitic mother may come into the world presenting lesions manifestly syphilitic, or be born apparently healthy and only become syphilitic after some months or even years. 8. Syphilis imparts no particular characteristic to the course of confinement. Mercurial treatment instituted at the beginning of pregnancy in syphilitics permits the mother: (1) often to carry gestation to term; (2) to give birth to a living, though sometimes syphilitic, child; (3) in some cases to give birth to a living child and without lesions; (4) sometimes the child born healthy of syphilitic parents remains free from syphilitic troubles when the mother has been treated during pregnancy. When, the father being syphilitic, the mother becomes pregnant and submits to mercurial treatment, there is much chance that gestation will terminate at term in the birth of a healthy child.

Incomplete Abortion—Expulsion of the Amniotic Sac Alone.

—William C. Stevens³ expresses the opinion that the membranes are retained in more than one-half of all deliveries occurring before the end of the third month, and during the first 6 weeks a larger proportion than this is retained. This opinion is based upon observed cases, and from the history of diseases clearly traceable to a recent miscarriage in which there was only a

¹ L'Obstét., July 15, 1897.

² La Clinique, iii., No. 5, pp. 182-194, 1897.

³ Internat. Jour. Surg., vol. x., No. 5, p. 138, 1897.

record of an excessive menstrual flow at or shortly after a regular menstrual period. The specimens presented by Stevens are, he states, the result of letting nature take its course, and in this way he has found that in about one-half the cases all the membranes are retained, and in about 25% of the cases the amniotic sac is expelled without the chorion. In the largest specimen the amniotic sac was expelled, leaving behind a well-formed placenta. Stevens concludes as follows: The remote effects of a neglected miscarriage are extremely disastrous, and are not so amenable to treatment as disorders following delivery at the full period of gestation. 1. Subinvolution; owing to the imperfect development of uterine muscles after an abortion the process of involution is slow and less perfect than after normal labor. 2. Anemia due to loss of blood, and septic infection through the slow absorption of poison from the uterus. 3. Acute and chronic inflammation of the uterus and its appendages. 4. Moles, due to retained membranes. 5. Disorders of the nervous system from local irritation. 6. Secondary infection of distant tissues. With such an array of misfortunes confronting the victim of a partial or incomplete miscarriage, it becomes us to exert our utmost endeavor to prevent them. First: We should educate our patients to the danger of neglecting miscarriages occurring during the early months of gestation. Second: The practitioner should neglect no opportunity to perfect himself in the science of diagnosing the period of gestation and the age and general appearance of the fetus and its envelopes at each stage of gestation, so that he may know when the abortion is complete. Patience and a tampon will complete many a miscarriage: the tampon to control hemorrhage and excite uterine contractions; patience to wait for the expulsion of the membranes. The finger may be used in cleansing out the uterus; but, like instruments, it will not meet all the requirements of everyday practice. A curet should always be found among the instruments. Absolute rest in bed for a period as long, if not longer, than at the full period of gestation, with a nutritious and easily digested diet, will restore the majority to perfect health.

Schwab¹ calls attention to the ecboic action of quinin, which, he claims, given in 1 gm. daily doses, has a manifest action upon uterine contractibility, and may therefore be suitably employed to detach the placenta in abortion. Unlike ergot, it is harmless in all cases; and if it fails, the expectant plan or active intervention may be tried. As to the action of ergot combined with strychnin, Atthill² concludes as follows: 1. When administered previous to the termination of pregnancy in the case of women in whom a tendency to postpartum hemorrhage is known to exist, it tends in a marked manner to prevent the occurrence of hemorrhage. 2. When so administered in ordinary doses it does not produce any injurious effects on either mother or child, and it seems to delay the beginning of labor in such cases. 3. It tends to make the involution of the uterus more perfect and lessens the chance of the occurrence of subsequent uterine troubles, many of which depend for their cause on imperfect involution of that organ. 4. It will not bring on premature labor or induce abortion unless uterine action has previously been set going. 5. In cases of threatened abortion its administration frequently seems to act as a uterine tonic, and in some cases tends to avert the danger of a miscarriage, provided the ovum is not blighted. 6. If the ovum is blighted, and especially if it is detached, ergot usually hastens its expulsion.

H. J. Garrigues³ says prophylactic measures frequently prevent abortions, as the institution of specific treatment where syphilis is the cause. Removal

¹ L'Obstét., May 15, 1897.

² Clinical Reporter, July, 1897.

³ Med. News, Nov. 6, 1897.

from a malarious district may check habitual abortions. Sometimes a uterine displacement needs correction. Rest in bed for a week at what would be the menstrual period, with teaspoonful doses of fluid extract of *Viburnum prunifolium*, 3 times a day, is a better plan than complete rest during the whole of pregnancy, which is very weakening. Violent exercise should be avoided. In threatened abortion opium suppositories, a saline, and an ice-bag to the hypogastrium may be used. If the hemorrhage is profuse or prolonged, the cervical canal open, or the ovum projects into the vagina, abortion is inevitable, and the uterus should be emptied at once. Tents and tamponading are not the best treatment. During the first 3 months of pregnancy the cervical canal may be dilated with conical, hard-rubber dilators. Later on, olive-shaped, hard-rubber dilators may be used, and, if needed, Hanks's dilators. For emptying the uterus Thomas's large dull-wire curet is excellent, except at very early periods, when a Recamier curet may be used, and still earlier Simon's sharp spoon may be used. When the uterus is small it is only necessary to pack the vagina after curettement; but if larger, the uterine cavity may be packed with iodoform-gauze. Before and after curettage the uterine cavity should be flushed with a quart of 1% creolin emulsion, used with a single-current metal tube. The tamponade is removed the next day, and a vaginal douche of 1% carbolized water given twice daily. Ergot may be administered in doses of 1 teaspoonful 3 times daily until 1 oz. has been taken. Anesthesia is preferable, and subsequent pain, if any, may be controlled by an opiate. The treatment given above applies also to cases of induced abortion. When pregnancy is terminated after the fifth month and the placenta is not expelled, tampon the uterus and vagina and wait 24 hours; repeat, if required, and, if there is still retention, mechanical interference is necessary.

Maygrier¹ maintains that interference is needed in incomplete abortion whenever hemorrhage or sepsis is clearly present, whenever the abortion is gemellar, whenever there is suspicion about the cause of the abortion, and whenever the retention lasts for several days. Even if there be no hemorrhage or sepsis he prefers the finger to the curet.

Beuttner² goes into the details of curetting the uterus. He uses strict antiseptic precautions, but insists chiefly on the three following points: (1) Before introducing the curet a sound should be used, and the length it penetrates marked on the curet, otherwise the uterus is liable to be perforated. It is not sufficient to estimate the length by the curet, as this instrument may cause a temporary active dilatation of the uterus, which is very misleading. (2) A speculum should always be used, for fear of infecting the uterus with vaginal organisms. (3) Iodoform- (or preferably xeroform-) gauze should be introduced into the uterine cavity after curetting, but in different ways, according as it has been done for hemorrhage or infection. In the former case the gauze should be packed well in to excite uterine contraction and left for 24 hours; in the latter it is introduced loosely, to act as a drain into the vagina, in which, finally, a plug of cotton-wool is placed to absorb the discharge.

EXTRAUTERINE PREGNANCY.

Symptoms and Diagnosis.—[T. W. Eden has remarked that ectopic pregnancy is a physiologic accident liable to befall any healthy woman during the fruitful period of life. There is no evidence to prove that diseased conditions of either uterus or tubes play any part in its occurrence. It is rare for

¹ Ann. de Gynéc. et d'Obstét., Aug., 1897.

² Rev. Méd. de la Suisse Romaine, Jan. 20, 1898.

more than 2 periods to be missed; after this comes hemorrhage, variable in amount, generally accompanied by considerable pain, and sometimes by the discharge of a fleshy mass from the uterus—the decidua cast. As a rule, the abdominal pain precedes the hemorrhage by a week or two, or even longer, and persists or grows more intense after the occurrence of the supposed abortion. In the great majority of cases rupture occurs during the third month. As regards the physical signs before this occurs, a pyosalpinx is usually accompanied by a much greater degree of surrounding inflammatory changes than a gestation-sac; it therefore tends to form a fixed swelling, harder in consistence and much less definite in outline. The uterus, although enlarged, is usually hard and its mobility greatly impaired, and the opposite appendages may be also obviously diseased.] According to J. Brettaner,¹ the symptoms of tubal pregnancy will be much more distinct if the walls of the tube are unable to reach the degree of distention required by the growth of the ovum. The tube will either gradually tear or else it will make efforts to expel its contents through its distal end into the peritoneal cavity. There is then a history of pain extending over hours or days, with but short intermissions. These pains are severe, begin usually in one inguinal region, and not infrequently cause the patient to feel faint or even lose consciousness for a short time. They are usually followed by the expulsion of pieces of decidua from the uterus. The special symptoms to which A. W. M. Robson² draws attention are: 1. A superficial dullness on percussion over the pubes and in either flank, which on deeper percussion gives a resonant note. 2. A thrill in the same regions on gently flicking with the finger-nail, though no ordinary signs of fluctuation can be felt. 3. On turning the patient over the dullness in the flank then uppermost persists for some little time, but gradually disappears in a way not noted in the case of any other fluid than blood in the peritoneal cavity. 4. Occasional loss of liver-dullness, due (a) to the liver having become diminished in size from the loss of blood, and (b) to the bowels having been pushed up by the effusion of blood in the pelvis. Dührsen³ attributes tubal pregnancy to peritoneal adhesions following perisalpingitis, resulting in change of shape and direction of the tube, or to catarrhal, usually gonorrhœal, inflammation of the tubal mucosa, accompanied by arrest of the peristaltic movements of the tube and loss of the cilia of the cells. In both cases there is a hindrance to the passage of the fecundated ovum toward the uterus, while the penetration of the spermatozoa is facilitated.

Hirst⁴ has analyzed 22 cases of extrauterine pregnancy to elucidate the value of the history of pain and of menstruation for diagnosis. He gives 3 cardinal symptoms: (1) Pain, characteristic in nature, manner of occurrence, and situation; (2) irregularity of menstruation, often with the discharge of what the patient calls "pieces of flesh;" (3) the following physical signs: For the first 2 to 4 weeks a swelling in the tube, no bigger than the end-joint of one's thumb, and unadherent; later, an exquisitely-sensitive mass fixed in the pelvis by thick velvety adhesions. Pain has been the most helpful symptom in guiding the author to a diagnosis. It may be defined as a pain described by the patient in the strongest terms; occurring in paroxysms with free intervals; appearing at any time from a few days to months after a normal menstruation; situated often in one groin, though often referred to the lower abdomen, and sometimes shooting down one leg or up to the epigastrium; and so severe as to occasion profound systemic disturbance, such as syncope and excessive shock, which the author attributes to pain rather than

¹ Med. News, July 23, 1898.

² Arch. f. Gynäk., vol. xiv., No. 2, 1897.

³ Brit. Med. Jour., Jan. 29, 1898.

⁴ Am. Jour. Obst., Apr., 1898.

to hemorrhage. The characteristic menstrual history of extrauterine gestation is one of irregularity, and often not of cessation at all. In 27% of Hirst's cases there was no cessation, and in 18% more a menstrual period was only delayed 10 to 12 days. Prolonged uterine bleeding, on the other hand, preceded or followed by the discharge of decidua, is the almost universal rule at some period in the history of a tubal pregnancy.

C. J. Cullingworth¹ states that the irregular hemorrhages which are of great value in diagnosis are due to 2 causes: First, the irritation of the presence of a tubal mole in a part of the tube that has been entirely cut off from its communication with the uterus; second, the efforts of the uterus to dislodge and expel. There is a peculiarity about these hemorrhages that has hitherto received no attention. The blood is almost invariably dark in color, moderate in amount, thick in consistence, and steady in its rate of flow. The condition above all others for which early ectopic gestation with tubal mole is likely to be mistaken is a threatened or incomplete uterine abortion. The two important points in distinguishing the one condition from the other are: (1) The presence or otherwise of an abnormal swelling in the situation of one of the Fallopian tubes; (2) the character of the blood discharged per vaginam.

As regards the *decidual cast*, W. F. Whitney² remarks that its structure is like that of intrauterine pregnancy. In it there are to be distinguished 3 layers. The outer and more compact one is covered by a layer of rather cubical epithelial cells. In this are large thin-walled blood-vessels, from which comes the hemorrhage that is such a constant symptom of an extrauterine pregnancy, and which is often the first to attract the patient's attention. In this outer layer are also developed the decidual cells to their greatest extent. In the middle layer are a series of irregular cavities, formed by dilatation of the uterine tubules, giving to this part a spongy aspect; and in the deepest layer are the blind ends of the tubes. The diagnosis of pregnancy rests on the presence of the membrane with the characteristic decidual cells. The cells are very large, irregular in shape, often distinctly triangular, with a vesicular nucleus, and separated by clearer intervals from each other, in which are found numerous small cells, with a dense nucleus (lymphoid cells and leukocytes). The differential diagnosis would lie between a menstrual membrane and a sarcoma of the uterus. In the former the cells are all small, and the glands, if present, normal or but slightly dilated. In the latter the cells are more regularly round or spindle-shaped, are more abundant, lie very much closer together, and glands are, as a rule, absent. In the case of intrauterine pregnancy the presence of chorionic villi or bits of the embryonic membrane would be noted.

The Tubal Mucosa in Tubal Gestations.—Clarence Webster,³ like Fränkel and Abel, claims to have detected a true decidua in the tube in cases of tubal pregnancy. J. Bland Sutton denies that a tubal decidua exists. Webster insists that Fränkel, Abel, and himself did not endeavor to prove that a decidual formation might develop in the gravid tube, but, on the contrary, discovered decidual tissue in examining tubes purely with the object of defining their histology. Parry's theory, on which Sutton's views are based, is a mere hypothesis, as there is no reason to believe that he ever examined a section of pregnant tube with the microscope. Webster further maintains that if the placenta be examined in the case of an early pregnancy where escape into the peritoneal cavity has occurred, it presents appearances much the same as those found in the placenta of a miscarriage from uterine pregnancy, the maternal

¹ Med. Age, Jan. 25, 1898.

² Boston M. and S. Jour., May 12, 1898.

³ Am. Jour. Obst., Sept., 1897.

surface being covered with the thin superficial layer of the decidua serotina, irregular in its thickness and distribution. This irregularity is more marked in the case of the tubal than in the uterine placenta, because the development of the placenta in the tube-wall is more irregular in the former.

Fabre¹ claims, in opposition to the views of other authors (Frommel, Greestew, Thomson, Mandl), that the caliber of the tube is diminished, the vibratile cilia are destroyed, and the submucous connective tissue is hypertrophied.

Repeated Extrauterine Pregnancy.—Dorland² reports the sixteenth case on record of extrauterine pregnancy occurring twice in the same patient, the other authors reporting such cases being Galliay, Oulmont, Parry, Tait, Olshausen, Herman, Veit, Jr., Galabin, Mackenrodt, Reed, Coe, Hayden, Ross, Frankenthal, and Prewitt. Schofield³ reports the seventeenth case, R. Worrall⁴ the eighteenth, Czempin⁵ the nineteenth, J. F. Erdmann⁶ the twentieth, and Falk⁷ the twenty-first case on record.

The Placenta in Abdominal Pregnancy.—Taylor⁸ remarks that there are 4 distinct relations of the placenta to the main gestation-sac in abdominal pregnancy which need some differentiation. In the first group of cases the placenta is practically within the main gestation-sac and covered by reflexions of the amnion. In the second it has a fetal and a maternal surface of equal dimensions, as in normal pregnancy, the fetal surface being covered by the amnion and in immediate relation to the sac, while the maternal surface is growing from the spread-out remnants of the tube and from the peritubal tissues also, the back of the uterus, the broad ligament, and the pelvic wall being favorite sites for such extension of attachment. In the third the placenta remains within the tube, the tube is still recognizable, and the maternal attachments are confined to the tube itself. In this case there may be a double gestation-sac, the one containing the fetus, the other the placenta. In the fourth the placenta is attached to the upper wall of a broad-ligament sac outside the peritoneum, and the cord passes to the child through a hole in the ligament. The sac in abdominal pregnancy evidently varies greatly in appearance and consistency. In many of the recorded cases it can hardly have consisted of anything more than the amniotic membrane. This has become attached to the peritoneum, "its epithelial lining becoming destroyed and its subepithelial layer (in some places) becoming dense and fibrous" (Webster). In other situations the subepithelial layer has been unaffected, and the membrane is directly attached to the intestine or the abdominal viscera, is indistinguishable by sight from the proper peritoneal surface of such viscera, and only visible when reflected from one viscus to another. The membranes are not, however, necessarily adherent in this way; sometimes they have a completely independent existence, and probably all degrees of partial attachment are possible. Sometimes their consistency and independence are such that they have been described as being extirpated (Tait) or sutured (Rosenmauer) at the operation for removal of the pregnancy. Cases so described are, however, sometimes open to the suspicion that an unrecognized broad-ligament pregnancy has been mistaken for an abdominal. In true tuboabdominal pregnancy the sac, consisting at the best of amnion and chorion, and often perhaps of an amniotic layer only, must, if independent, always be extremely thin and easily broken. If completely independent it may admit of removal with the child,

¹ Gaz. hebdom. de Méd. et de Chir., June 30, 1898.

² Ibid., Mar., 1898.

³ Centralbl. f. Gynäk., No. 28, 1897.

⁷ Zeit. f. Geb. u. Gynäk., vol. xxxviii., part 2, 1898.

² Am. Jour. Obst., Apr., 1898.

⁴ Indian Med. Rec., Sept. 16, 1897.

⁶ N. Y. Med. Jour., Oct. 9, 1897.

⁸ Lancet, June 4, 1898.

but it is extremely doubtful if it could ever possess sufficient independence and consistency to admit of independent suture. The extrauterine placenta at term is an object of considerable interest. Throughout the whole course of the gestation the placenta has marked the site of the original and main attachment of the ovum, and in its attachments has held, and still holds throughout, the key to much of its pathology and treatment. When the infant has arrived at term the placenta has also reached its fullest development, and the extrauterine placenta at term, though often deformed in shape, keeps close to the normal standard both in size and weight. The method by which it has attained this development outside of the uterus may well demand attention. Sutton states: "The fully developed uterine placenta is composed of parts derived from the maternal and fetal tissues in nearly equal parts; a tubal placenta is mainly, if not entirely, derived from the fetal tissues." It is true that there is no clear evidence of a tubal decidua, but the placenta as it increases in size (like a new growth in its progress) absorbs, assimilates, and metamorphoses into its own tissue that of the Fallopian tube in which it was originally enclosed, and possibly the ovary of the same side also. In a considerable number of cases it is reported that neither ovary nor tube could be identified on the side of the pregnancy. So completely is this done that all traces of the tube may be lost at term or only the fimbriated end be found. When by the reflection of the amnion this invasion of the placenta is limited to the tube and broad ligament only, the matter is solely one of pathologic importance; when there is no such limitation the consequences may be serious.

CORNUAL PREGNANCY.

Cullen and Wilkins¹ remark that cornual pregnancy is rare, but that when it is encountered rupture usually takes place between the fourth and fifth months, the patient dying with signs of internal hemorrhage. Some, however, advance to term, and 2 classes can be established: 1. Those attended with rupture. 2. Those in which rupture does not take place. Anatomically these cases differ from those of tubal pregnancy in that the uterus is flexed toward the side opposite the pregnancy, in that the pedicle of the fetal sac springs from the uterus at the internal os instead of where the tube comes off, and in that the round ligament springs from the outer side of the sac instead of from the uterus. Clinically the symptoms of tubal pregnancy and of pregnancy in a rudimentary uterine horn when rupture has taken place are virtually the same. On examination of the uterus, however, the sound reveals that in the latter case the canal is flexed at the internal os and the uterus deviates to the side away from the tumor. The pedicle to the sac commences at the internal os instead of at the uterine cornu, and is usually of sufficient length to allow free mobility of the impregnated rudimentary horn. The treatment consists in amputation of the impregnated rudimentary horn. Migration of the ovum and spermatozoid occurs frequently when the impregnation of a rudimentary uterine horn takes place.

LABOR AND THE PUERPERIUM.

Anesthetics in Labor.—For the pains of the first stage of labor J. W. D. Hooper² prefers the use of vaginal tampons of glycerin and cocain pressed against the rigid and slowly dilating os externum. In the second stage he uses chloroform-inhalations. There are some conditions in which it

¹ Johns Hopkins Hosp. Rep., vol. vi., 971.

² Intercol. Med. Jour. Austral., Oct. 20, 1897.

is inadvisable to administer anesthetics during labor, such as edema of the lungs, double pneumonia, goiter, flooding, and emphysema of the lungs or thoracic cellular tissue. He notes that it has been found that during suspended animation in chloroform-toxemia rapid dilatation of the sphincter and stimulates the respiratory center and reestablishes respiration. Therefore the pressure of the presenting fetal part on the perineum impels the woman to increased respiratory efforts, and is a safeguard during chloroform-narcosis. In America, during the last decade, ether has replaced chloroform as the anesthetic for parturition; but, according to Hirst, ether delays the secretion of milk and renders it unsuitable for the first week of infant life. Davis¹ expresses the conclusion that the most recent experimental study indicates that the evil effects of chloroform result from vasomotor paralysis, causing the accumulation of blood in the abdominal viscera and bringing about partial or complete cessation of function in the nerve-centers from acute anemia. Pregnancy increases vasomotor tension, and thereby renders the pregnant woman less liable to the injurious effect of chloroform. In normal labor the actual expulsion of the child may be safely rendered painless, dilatation of the birth-canal furthered, and laceration diminished by light and transient narcosis from chloroform. In tetanus of the uterus, eclampsic convulsions, and maniacal labor, chloroform is to be preferred to ether, and is most useful. Profound narcosis from chloroform is seldom, if ever, necessary in obstetric practice, and, like this condition under ether, is attended by risk. A. Worcester² claims that chloroform produces partial anesthesia much more quickly than ether, and with less loss of consciousness, and allows a correspondingly quick recovery from the anesthesia. It is also less irritating to the respiratory tract. In addition, chloroform is noninflammatory and nonexplosive, and has a less injurious affect on the kidneys. W. Clark³ states that chloroform, in doses of 15 to 30 minims, produces no disturbance. It should not, however, be used in the first stage, in order to avoid its cumulative action.

At the Sixth Congress of Russian Physicians, Bakoemsky⁴ related his experience with 53 women, with normal labor, to whom he administered anesthetics. To 45 he gave ether, and to 8 chloroform. The investigations, carried on partly by the aid of the tokodynamometer and partly by other instruments of precision, showed that during the administration of ether the pulse and the respiration remained almost the same, and the contractile force of the uterus was increased; the duration of labor was shorter; in no instance was there albumin in the urine; the involution of the uterus seemed to progress more rapidly; in the new-born icterus was more rare; they lost less weight during the first week. The experience with chloroform was not quite so favorable, as it somewhat slows the progress of labor. In conclusion, the author says that in ether we possess an ideal remedy to abolish the suffering in labor, and we should employ it much more frequently than we do. He is surprised that this view is making such slow headway among physicians. Archangelsky⁵ says that for several reasons the external application of chloroform to the abdomen in severe and irregular labor-pains is superior to chloroform-anesthesia. He employs a mixture of 1 part of chloroform to 2 or 3 parts of olive-oil, rubs it in well on the abdomen, and then applies a warm compress. In a very short time the pain is relieved and the contractions become regular and more effective. Its advantages over chloroform-anesthesia are: The patient remains fully conscious, the pulse and respiration remain good, and

¹ Boston M. and S. Jour., p. 193, Aug. 22, 1897.

² Ibid.

³ Ibid.

⁴ Canad. Pract., Nov., 1897.

⁵ Vrach, vol. xix., p. 355, 1897.

there are no nausea, no vomiting, and no uterine atony. Hensen¹ finds that morphin, in doses of less than $\frac{1}{8}$ gr., exerts no influence on the force of the pains and the abdominal muscles. Ether causes a distinct effect, as after 1 or 2 minutes the force of the pains is diminished and the interval prolonged. When ether is discontinued the previous force of the pains is restored in from 5 to 20 minutes. Under ether-narcosis the abdominal muscles cease to aid in the process of labor. Chloroform produces similar effects on the pains; but when its administration is suspended restoration of the pains to their previous force and frequency is very much slower. Its evil influence does not disappear for quite 2 hours. Hence Hensen urges that ether should always be used as the anesthetic in labor. It facilitates turning and forceps-delivery as well as the ether-compound, whilst its effects very rapidly disappear, a most desirable result when we remember the chances of postpartum hemorrhage after instrumental labor.

Savitzky,² as the result of 17 years' experience, commends antipyrin enemata as an obstetric anesthetic. He administers 1 gr. every 2 to 6 hours, occasionally combining the drug with opium (from 15 to 25 drops of Russian tinctura opii simplex, which contains 1 part of opium in every 10 parts). The pains are always relieved in 15 or 20 minutes after the first dose. Frequently the patient soon falls asleep, which is especially beneficial in cases of spasmodic uterine pains and tetanic contraction of the os; hemorrhage also diminishes. No untoward accessory effects were ever observed by the authors. According to Misrachi,³ it is useless for the pains of a perfectly normal labor, but finds its chief usefulness in those cases in which the pains are so excessive as to interfere reflexly with the proper uterine contractions. It is also indicated in tedious labors when the pains are severe. When the liquor amnii has been discharged too early and there is rigidity of the os it is also useful. It is useless in the second stage of labor. There is evidence, however, that antipyrin is able to relieve "after-pains," and to quiet a tendency to the development of pains before full term has been reached.

The Value of Ecbolics.—[The abuse of ergot has led to so radical a change in the views of medical men as to the useful qualities of that drug in obstetric practice that the other extreme has been reached, and it is now scarcely ever used. The great majority of obstetricians nowadays seem to have arrived at the opinion that the use of ergot is not indicated in any stage of labor, but that after the uterus is completely emptied of its contents it may prove valuable in the prevention of postpartum hemorrhage.] T. More Madden⁴ joins issue with these conclusions, and holds to the view that under many conditions of labor the use of ergot is most beneficial. He says that as regards the circumstances under which ergot may be employed in midwifery practice, "judging from the recent literature of this subject, it may not be superfluous to premise that to use ergot or any of its preparations safely and effectively during parturition the presentation should, as a rule, be cranial; that there should be no disproportion between the fetus and maternal parts, nor any obstacle to a deliverance in the genital tract; that the os uteri, if not previously fully dilated, should at least be sufficiently dilatable to allow speedy deliverance; and that a preparation of ergot should be selected and a dose given calculated to produce the required ecbotic effect. Under such conditions ergot may be given with utility when required either before, during, or after the second stage of labor—viz.: First. In some instances: (a) delay from inertia of the uterus before full dilatation of the dilatable os, and in which there is an evi-

¹ Arch. f. Gynäk., vol. lv., Part 1, 1898.

² Quart. Med. Jour., Jan. 1898.

³ Vratsh, No. 22, 1896.

⁴ New Orl. M. and S. Jour., July, 1897.

ident danger to either mother or child from protraction of labor. Second. It may be administered during the second stage: (*b*) in nearly every case of long delay from inertia wherein the presentation is natural and the delivery not otherwise impeded, or in which (*c*) there is reason to apprehend either the probability of subsequent hemorrhage or any such complication as may call for its use. Third. During the last stage of labor this ecboic may be employed: (*d*) to hasten the expulsion of the placenta when delayed by inertia, or (*e*) for the arrest of hemorrhage. Fourth. After labor ergot may be resorted to either immediately: (*f*) to prevent or check flooding; or subsequently (*g*) to produce such tonic or permanent contraction as will effectually seal up the uterine vessels and so lessen the liability to subsequent septic invasion; or (*h*) to effect the expulsion of clots and so arrest after-pains. Fifth, and lastly, (*i*) to stimulate such contraction as may quicken or secure the process of involution after parturition." Madden believes in bold, full, and effective dosage of ergot, and uses the fresh liquid extract of the British Pharmacopeia. The dose he gives is 2 or 3 drams by the mouth and 1 dram by deep hypodermic injection in the gluteal region at the same time. An abstract of 150 cases in which ergot was used in all stages of labor, as well as after the birth of the child, are given. In 148 cases the result was favorable to the mother.

The value of quinin as a stimulant of uterine pains has been ably discussed by Hare,¹ who quotes Hirst as stating that in his experience quinin has rarely, if ever, acted efficiently in cases of uterine inertia; but, on the other hand, has actually imperilled the life of the patient by producing alarming postpartum hemorrhage. Hare remarks that there is undeniable evidence that quinin does produce a hemorrhagic effect in some persons. There seems to be a general consensus of opinion that quinin exercises an irritating influence on the genito-urinary tract, and it is evident that it is not a first-rate uterine stimulant; and for this reason its ordinary contraindications are so great as to limit its oxytocic usefulness. While quinin sulphate has little or no power to induce labor-pains, Schwab² is positive that after uterine contractions have once begun the administration of quinin causes them to become rapid and energetic. He obtained excellent results from its use in all cases of prolonged labor due to uterine inertia. While quinin strengthens the labor-pains, it does not tend to induce abortion. Unlike ergot, it causes intermittent and not tetanic contractions, and may therefore be prescribed without danger during the second stage of labor. Its action begins in about one-half hour; the drug is therefore best given in 2 doses, of 8 gr. each, within a period of 10 minutes. Quinin is indicated if, after rupture of the membranes, labor is unnecessarily prolonged on account of uterine inertia, the mother is exhausted, and there is danger of the child becoming asphyxiated. While quinin has a tendency to produce postpartum hemorrhage, this is easily controlled by massage of the uterus.

The Cervix Uteri and Attitude of the Fetus in Leopold's Sections.—A. H. Freeland Barbour³ states that Leopold maintained that his sections gave no support to the view that the cervix was taken up so as to form part of the cavity in which the ovum lay, whether mechanically by dilatation, or physiologically by differentiation. The mechanical taking up necessarily implied the shortening of the cervix. The more recent view, brought forward by Bayer, was that the cervix contributed to the lower pole of the uterine cavity by a process of growth, its mucosa being converted into a decidua, and its muscular fiber becoming transformed into that of the lower uterine segment. In this view the cervical mucosa in part continued as

¹ Therap. Gaz., July 15, 1897.

² Méd. mod., No. 3, 1897.

³ Brit. Med. Jour., Mar. 19, 1898.

cervical mucosa, in part differentiated into decidua. Bayer's view was based on insufficient data. The most important recent contribution on this subject was a monograph on the cervix and lower segment by von Franqué, of Würzburg, who described 34 uteri in the Würzburg Museum, and gave a table of all the cases reported in medical literature, which comprised 117 uteri from pregnancy, 26 from labor, and 75 from the puerperium. His conclusions were, that the os internum remained closed during pregnancy unless "pains" were present, and that there was no constant difference between the length of the cervix in primiparæ and multiparæ. The length of the cervix at the various months of gestation varied within certain limits; it grew slightly in length in pregnancy. There was no evidence of its being taken up to form part of the cavity in which the ovum developed. In labor it did not become essentially elongated, the elongation from stretching being counteracted by shortening from dilatation. The firm attachment of the peritoneum which marked the upper limit of the lower uterine segment rose higher as pregnancy advanced. The relation of the bladder was variable. Von Franqué drew attention to 2 specimens in which the bladder was almost completely separated from the uterus, and the peritoneum descended correspondingly deep, coming into relation with the anterior fornix. Two of these were from nonpregnant patients; and its occurrence in pregnancy seemed simply to be the persistence in it of an anomalous disposition of the peritoneum found in some patients. The development of a contraction-ring in normal labor, and its presence in anatomic specimens, he considered proved by the materials he had collected. He had never found cervical mucosa extending over the lower uterine segment. Leopold, in discussion, accepted von Franqué's conclusions. As regards the attitude and position of the fetus, 4 of Leopold's cases were of breech- and 5 of head-presentation. The large proportion of breech-cases struck one, and these were from the sixth, seventh, eighth, and ninth months (lunar), therefore earlier than in our reckoning. The 5 head-presentations were from the end of the ninth, the beginning of the tenth lunar month, and 3 from full term. In 2 of the breech-cases the diagnosis was a vertex-presentation, the change to a breech taking place in the agony. The commonest breech-position thus arose from the second commonest head-position by the fetus turning a somersault. Attention was next drawn to the effect that the cord might have on the attitude of the fetus, as brought out by Leopold's specimens. Next, there was the turned fetus from a case of placenta prævia. The child lay right occipito-posterior. The os was dilated to the size of a 3-mark piece, the fingers pushed in, the right leg (that nearest the sacrum) pulled down. The patient died a few hours later. The os externum gripped the right thigh just below the nates, so that the fetus from this point upward lay within the cervical canal and the uterine cavity. When this occurred Leopold said it would be better treatment to dilate with a bag first, so as to make room for the breech to descend fully, or to be content with rupturing the membranes high up. He did not allude to the pulling down of both legs. He recommended that the anterior leg should be laid hold of, for if the posterior were brought down the anterior was extended and hitched on the pubes, and the fetus could only be delivered by the trunk rotating so as to carry the extended leg toward the sacrum, and allowing the pulled-down leg to slip out under the pubic arch.

The Treatment of the Umbilical Cord.—According to A. C. Wentz,¹ the wet dressings of the cord are lard, sweet oil, fresh unsalted butter, and petrolatum; the dry dressings are starch, iodoform, borie acid, salicylic acid, powdered acetanilid, bismuth, chalk, talcum, lycopodium, calomel, and others,

¹ Penna. Med. Jour., June, 1897.

used separately or in combination. S. W. Lambert¹ prefers stearate of zinc powder with gauze. Peaudecerf² describes a procedure recommended by Bar, which consists in the application of a small pair of clamps to the umbilical cord, in place of a ligature. The clamp is placed squarely across the cord, as close as possible to the abdominal surface. The cord is cut off next to the clamp and a light dressing applied beneath and above the instrument. On the following day the clamp is removed and the portion of the cord which was compressed in its jaws is cut away. A small sterilized dressing is applied, which does not require changing until the fifth day, when the fragment of the cord remaining will be found dry and already separated from the body. A bath is not given until cicatrization is complete.

Rochon³ points out that 3 kinds of dressing are applied to the umbilical cord—the oily, the moist, and the dry. To the first, he objects that it is imperfectly antiseptic and is opposed to the keratogenic transformation of the young epidermic elements; the second (moist) method is sufficiently antiseptic, but it delays the fall of the cord and often leaves an imperfect cicatrix; while the third (dry), by the rapid desiccation of the cord which it causes, produces the danger of premature separation and hemorrhage. To meet these objections, Rochon proposes the use of picric acid in solution. The cord is surrounded by a piece of absorbent cotton soaked in a 1:200 solution of picric acid. Thus the decomposition of the cord is prevented and cicatrization of the umbilicus is aided. A single dressing may suffice, but it is best to repeat it on the second or third day.

The Accurate Measuring of Temperature during the Puerperal Period.—Sarwey⁴ gives his results obtained from careful measurements of temperature in puerperal patients. For 12 years it was customary in this clinic to measure temperature in the rectum, and in round numbers 6400 observations were made. The best time for such investigations was between 6 and 7 in the morning and 5.30 and 6.30 in the afternoon. It is thought that a more reliable temperature is obtained in the rectum than elsewhere in the body. In the rectum 38.5° C. is taken as a normal temperature. During the first 12 hours after birth a rise of temperature is often observed, while normal involution of the genital tract goes on, and no infection can be diagnosed; this is commonly spoken of as “absorption fever.” In other cases a local or general infection can be diagnosed, which can be referred to the previous labor or the puerperal state. In others a purely accidental cause for fever, not connected with the puerperal condition, is present. It is also necessary to keep accurate record of the height and duration of fever in any patient, and of the number of attacks. In addition, the morbidity and mortality of any clinic may be computed from such records, and diagnosis confirmed by autopsy upon all fatal cases. The writer considers that to obtain strictly reliable records of puerperal cases the methods described must be followed.

The Temperature of Breast-milk.—Smester⁵ has made experiments upon the temperature of milk as it is taken from the breast of the mother. He used a form of breast-pump containing a thermometer, so that the temperature of the milk could be measured without admitting the external air. He finds that as the milk enters the child's mouth the temperature is always below 98° F. It usually varies from 96.5° to 97° F. It is evident that milk given to children should not be heated above these temperatures, and Smester claims that infants naturally decline milk warmed to any degree.

¹ Med. News, May 1, 1897.

² Rev. de Thérap., Sept. 1, 1897.

³ Rev. obstét. internat., Aug. 21, 1897.

⁴ Centralbl. f. Gynäk., No. 15, 1897.

⁵ Mal. de l'Enfance, No. 15, 1897.

The Elimination of Germs through the Milk-glands.—Bach and Weliminsky¹ report experiments undertaken to show the results of the presence of infectious germs upon the milk-glands. They selected guinea-pigs for their researches, and took every precaution to make the glands and nipples thoroughly aseptic. They then injected cultures of anthrax, which resulted fatally to the animals, but which did not produce infection of the milk. The opposite, however, was the result when intravenous injections of pus-forming bacteria were made. In from 5 to 8 hours after injection these organisms were found in the milk. In the cases of 2 women suffering from puerperal septic infection streptococci were found in the blood, but not in the milk. The writers conclude from their experiments that infective germs which gain access to the milk do so simply by circulating through the glands in the blood-stream, and that to enter the milk they must pass through the glandular substance of the breast through some injury to the gland-substance. The question whether the milk of an infected animal is fit to use must be settled for each case by a careful study of the individual patient.

Antipyrin and Lactation.—After various researches made by M. G. Fleux,² he reached the following conclusions: 1. Antipyrin certainly passes in a natural state into the milk. 2. Given in large doses, in 2 capsules, each containing 15 gr., at intervals of 2 hours, it may be detected in the milk in from 5 to 8 hours after its ingestion, and in from 19 to 23 hours afterward it cannot be discovered, so elimination lasts 18 hours at the maximum. 3. The antipyrin during this time passes into the milk only in an excessively small proportion, very much less than 50 parts in 1000; it is only in exceptional conditions—for instance, when 60 gr. are administered in 16 hours—that it perceptibly reaches this proportion. 4. It does not influence in any way the quality of the milk, and particularly the lactose, the casein, or the fat. 5. It seems to have no action at all on the secretion, which always remains very abundant, provided the woman continues to nurse. 6. From the absence of general symptoms and from examinations of the weight, the infinitesimal quantity absorbed by the nursing does not seem to have any unfavorable action.

MATERNAL DYSTOCIA.

Puerperal Eclampsia.—According to J. A. Clark and T. L. Skelton,³ in eclampsia there is primarily the nonelimination of the products of retrograde carbohydrate metamorphosis, and these products undergo further decomposition, with development of convulsive poisons and acetone. In nonnitrogenous elimination the waste-products from the fetus, in addition to those of the mother, are sufficient to irritate the liver-cells, with the production of the peculiar fatty degeneration. When this irritation is sufficient to cause more or less complete nonelimination the waste-products quickly accumulate and undergo those changes which result in eclamptic poison and acetone. This theory accounts for the fact that the best results in treatment are obtained from hepatic stimulants and cholagogues. Carl Braun has for his routine treatment a pill of aloes and colocynth, from which he reports unusually good results. The poison originates partly in the fetus. How else can we explain the cessation of convulsions after the death of the fetus, even though retained in the uterus, or after delivery of the child? Those cases of eclampsia occurring during and shortly after labor are caused by contraction of the uterus forcing suddenly from the uterine sinuses the blood, which is loaded with the result of tissue-

¹ Berlin. klin. Woch., No. 45, 1897.

² Bull. méd., Sept. 5, 1897.

³ Am. Jour. Obst., Feb., 1897.

changes in the fetus, into the maternal circulation; inasmuch as systematic examination for acetone has never been made, its exact relation to eclampsia and its prognostic importance have not been determined. Its relation to tissue-changes is such that no examination of the urine of pregnant women is complete without an examination for acetone.

J. C. Simpson¹ states that 2 convulsive principles are found in normal urine. One is a "fixed, stable, organic body, destroyed by carbonization, yet retained by charcoal; it is insoluble in alcohol, as either base or a salt, and may belong to the group of coloring-substances." The other is fixed and inorganic, and is, in fact, potash. Faulty elimination of these products might be sufficient to induce eclampsia without other waste-products which probably accumulate during pregnancy. There are 2 primary and certain secondary sources of auto-intoxication to consider: First, there may be primary derangements of the liver, with secondary intestinal decompositions; and later, renal irritation and insufficiency from absorption and excretion of toxins. Second, there may be a primary renal insufficiency so marked that if the hepatic and intestinal functions are slightly deranged serious symptoms may arise which would not have been induced had the kidneys been acting normally. Whether intestinal derangement is an active factor in the case might be determined if it were possible to estimate the ratio between the free and aromatic sulphates in the urine. Hunter, in treating on the causation of pernicious anemia, showed that an increase in the ratio of aromatic over free sulphates is evidence of intestinal decomposition and putrefaction, and that "the destruction of the blood was effected by the action of such poisons absorbed from the gastrointestinal tract." Not every case with an inefficient liver or kidney is attacked with eclampsia. Acetone in the urine is indicative of hepatic derangement. Vicarelli found acetonuria in 9 cases out of 137, all of whom were delivered of dead infants. The acetonuria disappeared in 4 days; no mention is made of eclamptic symptoms. Stumpf found the urine of eclamptic cases contained more sugar, even before the attacks, than the urine of ordinary pregnant women, doubtless the result of hepatic derangement. As one of the convulsive toxins in the urine probably belongs to the group of coloring-substances, the relation between hepatic and intestinal derangement and convulsions is intimate. Van der Velde found that pregnant rabbits were more sensitive to the action of normal human urine than non-pregnant animals. Clonic convulsions appeared after the injection of 23 c.c. of urine, whereas 51 c.c. of the same urine produced no effect on nonpregnant animals. The defibrinated blood of a pregnant rabbit caused convulsions when 18 c.c. per kilogram had been injected, while the blood from a nonpregnant rabbit required 25 c.c. to produce any effect. When the urine of the same animals was injected, that of the pregnant one caused convulsions with 18 c.c. per kilogram, while 30 c.c. per kilogram from a nonpregnant rabbit caused no convulsions. This shows both an increased activity during pregnancy and a greater susceptibility of the nervous system to convulsive toxins, and this does not cease immediately after labor. This, and the fact that the blood is the source of the toxicity, are proved in one instance, in which there was rapid reaction to the injection of blood taken 3 days after labor, though the urine was not more convulsive than normal; in another case the effect of the injection of blood was noticeable up to the eighteenth day after delivery. "There is thus a renal insufficiency which causes accumulation of toxins in the blood during pregnancy, in addition to those found in normal urine, and the combined results may be seen in the symptoms of eclampsia." The toxic theory of eclampsia is also supported by the occurrence of various neuroses during pregnancy or

¹ Lancet, July 10, 1897.

the puerperium; as the toxicity of the blood persists during involution, any renal insufficiency will be an important factor in the production of such neuroses. It seems possible that the severe muscular exertion of labor, by adding rapidly the waste-products of muscular exercise to the toxins present, together with renal inadequacy, may be sufficient to determine puerperal neurosis, since neurosis can be caused by the faulty metabolism of gout, rheumatism, and diabetes.

W. W. Potter¹ laid down the following principles of the etiology and treatment of eclampsia. Particularly does he emphasize the fact that he takes issue with Charpentier on the subject of premature labor: (1) Though the pathogenesis of eclampsia is unsettled, it belongs solely to the pregnant or puerperal state. It is not apoplectic, epileptic, or hysteric in character. (2) It depends upon toxemia due to overproduction of toxins and underelimination by the emunctories. (3) These toxins probably have their origin in the ingesta, in intestinal putrefaction, in fetal metabolism—one or all; and there is coexisting sluggishness, impairment, or suspension of elimination. (4) When the prodromes of eclampsia appear the kidney should be examined as to its functions and all symptoms carefully watched. (5) Treatment is (a) preventive and (b) curative. Preventive treatment is medicinal and hygienic; curative treatment is medicinal and obstetric. (6) Milk-diet and distilled water should be given in the preeclamptic state to dilute the poison, hasten its elimination, and nourish the patient. (7) Blood-letting should only be employed in plethora or cyanosis. It is liable to cause anemia if persisted in or repeated; whereas red blood-corpuscles must be conserved, not wasted. Glonoin diminishes vasomotor spasm; hence it may be given freely in appropriate cases. Veratrum viride is a cardiac depressant, and a dangerous remedy if pushed to an extent that will control convulsions. (8) Eclampsia is the expression of a further maternal intolerance of the fetus; hence, as a primal measure, the uterus should be speedily emptied of its contents. (9) Medicinal treatment alone is delusive, and when relied upon exclusively is fraught with danger both maternal and fetal; whereas in the prompt induction of labor is found a rational application of science to a desperate condition. (10) Finally it furnishes, in the present state of our knowledge, the only basis of expectation for a diminished mortality in a toxicemic disease of high death-rate.

Atresia of the Vagina and Cervix in Labor.—A. Vedin² states that of 313 cases of atresia vaginae complicated by pregnancy, 257 were delivered *per vias naturales*, while 56 required Cesarean section. Of the 257, spontaneous delivery occurred in 82 cases, the majority of these being of the membranous or congenital variety, or simply narrowing of the vagina, 11, however, resulting fatally from rupture of the uterus or vagina, or from peritonitis. In 122 cases delivery was accomplished by incisions or by forceps, or by both, with 18 deaths from rupture of the uterus or vagina, peritonitis, and eclampsia. In 21 cases version, perforation, or embryotomy was required, 6 ending fatally for the mother. After a careful consideration of all the cases of atresia and stenosis vaginalis in labor, J. J. E. Maher³ concludes: 1. That from 70% to 80% of all the cases are found to be in the middle third, or at the orifice of the vagina, at which point a predisposing condition may be found in an increase of muscular tonus. 2. That the small size of the opening does not necessarily jeopardize the case, inasmuch as none of the complete atresias proved fatal, and among the fatal cases 4 had openings large enough for the finger to pass. 3. That the resistance can be overcome in every case, as evi-

¹ Jour. Am. Med. Assoc., Aug. 28, 1897.

² Med. Rec., Oct. 2, 1897.

³ Am. Medico-Surg. Bull., Mar. 10, 1898.

denced by the fact that only 2 of the 10 cases termed cartilaginous proved fatal. 4. That the thickness which, in 15 cases, was stated at from 20 mm. to that of the entire length of the vagina, is not an insuperable barrier, for only 2 of such dimensions were fatal. Of the other 2 fatal cases wherein measurement is given, the thickness in one was 12 mm., and in the other was characterized as thin and rigid. 5. That there is practically no difference in the character of the structure, site, location of opening, central or otherwise, resistance, or thickness between the congenital or postpartum cases, which amount to 87% of the whole. 6. That the complications should not necessarily prove fatal.

Dry Labor.—G. Brodhead¹ thinks that the restriction of the term dry labor to those cases alone in which the membranes are ruptured prior to or with the first pains is too narrow. It should apply to all cases in which the rupture occurs during the first stages of cervical dilatation. The occurrence of premature rupture is quite common. It occurred in 15 out of every 100 cases, in Brodhead's service at the Sloane Maternity Hospital, with the first pain or before. It occurred twice as often, fortunately, in multipara as in primipara. Increased pain from the substitution of a solid for a fluid dilator, edema of the cervix, exhausting protraction of the labor, lacerations with increased liability to sepsis and hemorrhage, and even rupture of the uterus itself, are among the dangerous consequences to the mother from this cause. To the child, death from asphyxia and meningeal hemorrhage are the 2 most important considerations. The premature escape of meconium, unusually vigorous fetal movements, marked increase or decrease of the fetal heart-sounds, are among the danger-signals as regards the child. The treatment in dry labor should be both prompt and active. If rupture occurs before labor begins, a large dose of castor-oil and glycerin should be given, followed by 10 gr. of quinin, repeated every 3 hours, with $\frac{1}{30}$ gr. of strychnin every 2 hours, given with the object of inducing labor and strengthening the pains. "Outside infection" should be guarded against by suitable precautions. Douches of 1% lysol solution, in quantities of 3 quarts every 6 hours, serve a useful purpose. Chloral and opium should be administered with unusual care in these cases, on account of the danger therefrom to the child. The plan of tightly tamponing the vagina with sterile gauze, as in abortions and placenta prævia, as suggested by E. A. Tucker, seems theoretically a rational procedure. The indications for operative interference in these cases vary with the individual conditions present; but it may be said that early interference is in the interests of both mother and child. Jewett, in discussion, said that the majority of these cases, in his experience, had terminated normally. A. H. Ely said there was a practical advantage in adopting Winckel's classification of these cases of early rupture of the membranes—*i. e.*, (1) premature, or those in which the rupture occurred before labor had really begun; and (2) immature, or those in which the rupture occurred before complete dilatation. In the first class the physician should be guided by the fetal heart, the maternal pulse, and the maternal temperature in both the first and second stages. The text-books too often give a wrong impression by advising chloral and opium in dry labor. It seemed to him that stimulation was indicated, yet he did not favor the repeated douching recommended by the reader of the paper. If interference was indicated, it should be completed at one operation.

Ovarian Tumors in Labor.—R. G. McKerron² has collected the histories of 183 labors complicated by ovarian tumors. He showed that there still exists a divergence of opinion as to the most satisfactory treatment. The

¹ N. Y. Polyclinic, June 15, 1898.

² Brit. Med. Jour., Dec. 11, 1897.

results of the various methods were analyzed. To avoid the erroneous deductions to which mere statistical enumerations were liable, account was taken, where the data permitted, of the character of the tumor, of the duration of labor, etc., points which would be found noted in the tables. Attention was directed to a few features of interest in the clinical histories of the cases. Practical observations were made on the various methods of treatment, based on a study of the cases and of the literature of the subject. Reposition should in all cases be first attempted; when it failed a selection, according to circumstances, must be made from the following operative measures: puncture, Cesarean section, abdominal or vaginal ovariectomy. The indications for each of these methods were given. The author concluded with a brief reference to the after-treatment in those cases in which the tumor had not been removed during labor. E. Reynolds¹ believes that the first expedient tried should be gentle taxis with the patient in the knee-chest position, and, if necessary, etherized. If the taxis is unsuccessful, it should be repeated after the lapse of 1 or 2 hours; but if this attempt fails, the abdomen should be opened, and under ordinary circumstances the uterus should be incised and the fetus removed. In the event of unusually firm adhesions in the pelvic cavity, it would be better to defer the removal of the tumor to a subsequent operation, when the pelvic veins and arteries are not of the enormous size they attain at the conclusion of pregnancy. If there is a fair probability that the patient has already been infected with sepsis *per vaginam*, it would be better to remove the tumor only and deliver the child by forceps, to avoid infection of the peritoneal cavity.

Rupture of the Uterus.—Poroschin² comments on the want of exact knowledge of the cause of spontaneous uterine rupture. Most cases have been explained either by the mechanical theory of Bandl or by structural alterations in the uterine wall, due to chronic interstitial metritis, fatty degeneration, tuberculosis, etc. There remains a minority of cases to which neither explanation will apply, and in this group Dawidoff has concluded that the accident is generally due to alterations in the elastic connective tissue of the uterus. He finds that in 7 cases of spontaneous rupture of the uterus the elastic fibers were thickened, markedly shortened, and indistinctly outlined, with knob-like thickenings in the bends of the fibers.

According to Ludwig,³ these cases demand 2 sorts of treatment: the first is the delivery of the child; the second, the treatment of the tear in the womb. As regards the first, the child should be delivered through the vagina, if possible, especially when the greatest portion of its body is high within the pelvis when the physician sees the case, and also when a positive diagnosis of rupture cannot be made. If, however, the rupture is diagnosed, and the child is still within the uterus, delivery through the vagina should not be undertaken if it will increase the injury to the uterus, and thus add to that already existing. If the child has entirely escaped into the abdomen, then abdominal section must be performed. This is especially the case when the birth-canal is not dilated, when contracted pelvis is present, and severe hemorrhage occurs. If the child is living after uterine rupture, abdominal section gives it the best chance for life. It is often better to extract a dead child by abdominal section than to increase the injury to the uterus by other modes of delivery. So far as the treatment of the rupture in the uterus is concerned, the use of the tampon and compression of the wound are demanded only in mild cases. It is occasionally possible to suture the tear by operating through the vagina,

¹ Boston M. and S. Jour., Dec. 23, 1897.

² Centralbl. f. Gynäk., Feb. 19, 1898.

³ Wien. klin. Woch., Nos. 11 and 12, 1897.

although this is not usual. If the conditions are favorable abdominal section should be performed, and the tear in the uterus sutured in that way. Unless, however, the conditions are favorable for securing union, this must not be attempted. It is better to extirpate the uterus through the abdomen, if necessary, as it enables the operator to determine the presence or absence of injury to surrounding organs. In the presence of bleeding and collapse the most rapid method of operating is demanded. This consists in abdominal section, the use of the elastic ligature, with supravaginal amputation of the uterus. So far as results go, in patients who can be treated in hospitals abdominal section with uterine amputation is best. When patients have not the advantage of such treatment, the use of the tampon in cases of moderate injury is often successful.

Inversion of the Uterus.—Hector Treub¹ stated that the mechanism of inversion was understood only in those cases following immediately after labor. The 2 elements upon which, according to Gaillard Thomas, the inversion depends, were then present—namely, (1) relaxation and inertia of the uterine walls and (2) downward traction or pressure. In other cases the explanation is less obvious. The theories of Küstner and of Schauta and Gottschalk were insufficient, and Treub submits the following theory: The base of a sessile tumor cannot contract because of the implantation of the tumor, which diminishes or altogether abolishes the contractility of that part of the wall. And it cannot be that only the contractility of that base is diminished; the surrounding parts must necessarily be feebler within a greater or smaller circumference. If from the outset the tumor was intramural, the smaller degree of resistance of that part of the uterine wall, coupled with intraabdominal pressure, may occasionally bring about a slight beginning of inversion; and when this is the case the conditions are essentially the same for sessile and intramural tumors and for the partial inversion described by Rokitansky. A circle of uterine tissue is abruptly curved in the place where Rokitansky found the external indentation. In that incurved circle the uterine muscle must be absolutely paralyzed; and this paralysis, again, will not be confined to a linear circle, but, gradually diminishing, will extend over a greater or less surface. The contractions of the normal part of the uterine wall will try to expel the part of the wall that acts as a foreign body. These expulsive efforts may slightly increase the inversion as far as the paralysis surrounding the circle of inversion permits, thus displacing the circle itself and paralyzing another part of the uterine wall. Necessarily the extension of the partial paralysis proceeds further in the uterine wall, too, and by the repeated action of this muscular play the inversion may gradually become complete, as regards the body of the uterus. As soon as the body is inverted there is no longer any inducement for uterine contraction, and the inversion of the cervix generally does not take place; and it is the intraabdominal pressure, again, that may invert the cervix, too.

FETAL DYSTOCIA.

Multiple Pregnancy.—Bertillon² produced some documents before the Statistical Society of Paris recently, revealing the unexpected laws of the influence of age and the number of confinements over twin-bearing. Munich, for 15 years, has published the statistics of illegitimate births, whether single or multiple. From these the average number of twin-births is found to be 10.5 per 1000, according to the following interesting table of ages:

¹ Brit. Med. Jour., July 24, 1897.

² Sem. méd., Jan. 5, 1898.

18 to 20 years	4.8	31 to 35 years	16.2
21 to 25 "	7.5	36 to 40 "	20.8
26 to 30 "	12.1	41 to 45 "	19.5

This shows the frequency to increase with the age of the mother, till at 36 to 40 years the frequency is 4 times as great as at 18 to 20.

Similar statistics of New South Wales, for 1893 to 1895, give confirmatory results :

15 to 19 years	6.26	35 to 39 years	16.20
20 to 24 "	6.84	40 to 44 "	13.09
25 to 29 "	8.95	45 to 49 "	9.00
30 to 34 "	12.79		

The city of St. Petersburg, for 1882 to 1892, gave the following :

16 to 20 years	6.1	36 to 40 years	21.7
21 to 25 "	9.5	41 to 45 "	15.5
26 to 30 "	14.2	46 to 50 "	16.0
31 to 35 "	20.3		

This last statistical table contained also a record of the number of the accouchement at which the twin-births occurred :

At the first accouchement	8.1	At the seventh accouchement	21.5
" second "	9.9	" eighth "	22.3
" third "	13.4	" ninth "	25.7
" fourth "	15.0	" tenth "	27.3
" fifth "	18.7	All following accouchements	27.7
" sixth "	21.1		

Thus it is 3 or 4 times less likely to occur in a primipara than in the ninth or tenth childbirth. The age is less determinative, however, than the number of the accouchement. The liability to twin-births in primiparae at 36 to 40 years is very little greater than at 20 to 25 years. In fertile women the age is not determinative, but the number of previous confinements is decidedly so.

Stephenson¹ discusses the subject of twin-pregnancy, and especially the maternal risks. In general, the maternal mortality is more than double that of single pregnancy. This arises in some patients from convulsions—1 in 81 cases against 1 in 363 normal cases. Hemorrhage is 5 times more frequent in twin- than in single births, especially in the third stage of labor. The placenta is adherent twice as often in twin- as in single births. Retention of the placenta necessitating interference was 6 times more frequent in twin than in single births. Adhesion of the placenta was present in more than half the cases. Stephenson urges very sensibly that twin-labor is an incomplete labor after the first child is born ; the womb is exposed to incomplete retraction, and hence to hemorrhage ; no time should be lost in completing the delivery, preferably by version, thus avoiding risks of hemorrhage. Between 6% and 7% less cases of twin-labor end in a given time than with single births. As a result, care must be taken to avoid the dangers which delayed labor occasions. In general, twin-labor demands careful external examination of the patient to determine the presence of the second child. Unless the second follows quickly after the first twin, version should be done and the second twin delivered. All possible precaution should be taken to avoid failure of uterine retraction and hemorrhage.

Occipital Presentations.—J. G. Swayne² remarks that cases of occip-

¹ Scottish M. and S. Jour., No. 7, 1897.

² Bristol Med.-Chir. Jour., June, 1898.

ital presentation are of rare occurrence—that is, cases in which the posterior fontanel occupies the center of the uterine orifice, while the anterior fontanel is very difficult to reach if it be in front, and impossible if it be behind. The head also presents very much flexed. This is a complication very apt to occur in justomino pelvis. The point of the occiput forms the deepest portion of the presenting segment, the nape rests against the iliopectineal line, the summit of the vertex and the forehead lie on the opposite side, the face looks toward the fundus uteri, the long diameter of the head lies in the axis of propulsion, and the small fontanel is near the middle of the pelvis. Labor in such a presentation is apt to be protracted or even spontaneously impossible, forceps or turning being required.

Occipitoposterior Presentations.—Motta¹ believes that the form of the uterus, the direction of its axis, and the direction in which uterine contractions act exert the greatest influence. Of his 83 cases, 39 were primiparæ and 44 multiparæ. In 81 of these cases some abnormality in the shape of the pelvis existed, the pelvis being contracted. Early rupture of the membranes favored this abnormal rotation, as 48% of his cases had the waters break prematurely. This fact and the abnormal size of the pelvis lead to the conclusion that a disproportion between the fetal head and the pelvis is the primary cause of the abnormal rotation. As regards treatment, attention is drawn to the difficulty often experienced in the early application of forceps. On the other hand, expectant treatment is attended with considerable risk to mother and child. Motta's cases were treated by version in 33; craniotomy in 28; the forceps in 5; Cesarean section in 4; and symphyseotomy in 1; while 12 terminated spontaneously. Of the children, 39 were born living. All the mothers recovered. Motta advises the careful preservation of the bag of waters, and the use of elastic dilators, if necessary. When delay cannot be practised version should be performed, if the head has not engaged. When dilatation is not complete and the membranes have ruptured early, the safest method of delivery in many cases will be found in Cesarean section. The use of forceps will occasionally succeed if combined with Walcher's position. [In the paper just cited the author has overlooked the considerable proportion of cases in which the occiput rotates in front without interference. Two groups of cases, aggregating over 600, may be found in the literature of the subject, in which 98% resulted in spontaneous anterior rotation of the occiput.]

OBSTETRIC OPERATIONS.

Induction of Labor.—According to J. P. Boyd,² the induction of premature labor is indicated in placenta prævia, eclampsia, some cases of advanced heart- and lung-disease, general edema, jaundice, tumors, hydramnios; in multiple pregnancy when a dead fetus remains *in utero*; in cases in which the children of previous pregnancies have died *in utero* during the later weeks of gestation from disease of the placenta; in cases in which, in previous labors, the head of the child at full term has been prematurely ossified or unusually large, so that labor has been difficult and dangerous even with a normal pelvis. A new method of using glycerin for inducing labor is described by H. Saft.³ It consists in the introduction into the uterus of a catheter armed at its end with a dilatable balloon (a condom), which latter is to be filled with glycerin, 40 to 100 gm. This procedure, when practised upon animals for the induction of premature labor, proved more efficacious and less dangerous than any other

¹ Arch. f. Gynäk., Band liv., Heft 3, 1897.

² Albany Med. Ann., July, 1897.

³ Deutsch. med. Woch., No. 3, 1898.

method. The effect depends not only on the presence of the glycerin-balloon acting upon the uterus as a foreign body, but also upon the specific pain-producing action of the glycerin itself. The latter fact is true, even though in this procedure the glycerin can act in but very minute quantities. The author regards this action as due to the fact that the glycerin, by its power of withdrawing water, exerts an irritation upon the uterine nerves and ganglia. He thinks that instead of glycerin there may possibly be substituted a nonpoisonous, equally endosmotically equivalent substance—*e. g.*, sodium sulphate.

Forceps.—Michinard¹ quotes as dangers to the fetus from the use of the forceps fracture of the skull, cerebral and meningeal hemorrhage, facial paralysis, and idiocy; and to the woman lacerations of the soft parts, including the uterus, septicemia, and death. However, unassisted, prolonged labor causes increased suffering, inflammation and sloughing of the soft parts, vesicovaginal and rectovaginal fistulae, temporary or prolonged paralysis from pressure on the sacral nerves, maternal and uterine exhaustion, hemorrhage, septicemia, and death; and to the fetus fracture of the skull, fatal effusion of blood into the brain or meninges, obstruction of the placental circulation, and idiocy. Forceps-application is extremely dangerous when the anteroposterior diameter of the inlet is less than $3\frac{1}{4}$ in. In the *Clinical Rev.*, Oct., 1897, is an interesting table compiled from official reports of various European maternity-hospitals and clinics, showing the varying frequency in the application of forceps in labor. [This compilation illustrates the difference in opinion as to the time-limit, as well as other demands, for an instrumental delivery. These differing figures cannot be held to express much more than a varying practice, for logical deductions only could be made by having detailed knowledge as to the time-limit allowed in an otherwise normal labor, as well, also, as to the extent to which advantage is taken for the demonstration of the use of forceps to students, without other actual demands for their use existing.]

	Per cent.
Kezmarszky, Budapest, 1874-1882	1.4
Abegg, Danzig, 1872-1885	2.2
Von Winckel, Munich, 1884-1890	22.6
Leopold, Dresden, 1889-1894	2.56
Gusserow, Berlin (Charité), 1882-1886	2.66
Leopold, Dresden, 1883-1888	2.8
Von Winckel, Dresden, 1879-1883	3.
Ahlfeld, Marburg, 1881-1888	3.5
Von Rosthorn, Prag, 1891-1894	3.63
Stuttgarter, Geb.-Anstalt, 1872-1885	3.7
Braun, Wien	4.3
Kehrer, Heidelberg	4.6
Olshausen, Berlin	4.96
Fehling, Basel, 1887-1893	5.33
Sutugin	6.
Von Saxinger, Tübingen	6.5
Olshausen, Halle	8.4
Schantz, Innsbruck, 1881-1887	9.16
Schultze, Jena	11.6

S. Marx² holds that traction with the forceps can never be made too far backward, for if the head does not follow such traction the direction of the blades may always be gradually modified, so as to bring the traction a little farther forward each time. If the attending physician is at a loss to know exactly in what direction to institute the traction, apply the blades without chloroform and let the woman have several pains; then note the direction which nature causes the handles to assume. This proves the proper axis of traction, and can be at once and safely followed.

¹ New Orl. M. and S. Jour., Feb., 1898.

² Med. News, Dec. 4, 1897.

Symphysiotomy.—Varnier¹ would extend the operation beyond cases of pelvic contraction to cases of dystocia from great bulk of the fetus or from certain abnormal presentations (brow, etc.) in normal pelvises. Symphysiotomy should replace induced premature labor, the forceps, and version in cases of contracted pelvis. Varnier does not add to this list of older obstetric operations any form of embryotomy practised on the live child, as it is no longer advocated. Symphysiotomy is the only effectual process for enlarging the pelvis. Walcher's "hanging position," which stretches the sacroiliac synchondroses, is worthless, being all but impracticable on real patients; and experiments on the dead body show that the difference between the extreme of dilatation and compression of the synchondroses, as affecting the conjugate diameter of the pelvis, amounts to but 6 mm. (0.234 in.), on an average. Symphysiotomy should be confined to widening the bony pelvis. It is dangerous to have recourse to this operation in order to facilitate dilatation of the soft parts. The widening of the pelvis should be momentary; when the soft parts are at fault it has to be kept open for some time. Varnier and Pinard admit that this happened in one of their cases. Twelve hours were wasted, the wound suppurated, and the patient died of septicemia. Symphysiotomy must not be attempted for dystocia caused by tumors of the soft parts. Antepartum infection of the mother and distinct evidence of death of the fetus are also contraindications.

Cesarean Section.—Hirst² states that while certain conditions in parturient women forbid a freedom of choice as to operative procedure, in his opinion it will be found that the Porro operation will be absolutely required in practice a little more frequently than the Säger. In Hirst's own experience of 20 cases of Cesarean section, 17 of the number were hysterectomies. To subject a woman with an insuperably obstructed pelvis to the dangers of subsequent pregnancies and of repeated Cesarean sections is clearly unjustifiable, and for this reason the removal of the uterus is the preferable operation. Hirst finds that the disagreeable and annoying symptoms incident to early artificial menopause are neutralized by the function of lactation in cases of celiohysterectomy, and that as far as he has been able to ascertain, shortening of the vagina and loss of sexual feeling have not resulted in any of his Porro operations.

Guerard³ calls attention to the value of the measurement between the tuberosities of the ischia as an absolute indication for Cesarean section; while Fritsch⁴ emphasizes the advantages of a transverse cut across the uterus at the fundus in celiohysterotomy. He claims for this method the following advantages: 1. The incision is made higher in the abdomen than by the other methods, so that the scar comes in the umbilical region, making the liability to hernia much less. 2. During the operation the abdominal walls are easily kept in apposition, the uterus is readily compressed, and blood does not easily enter the abdominal cavity. 3. The bleeding is very slight, and the stitches readily close the vessels. 4. The legs of the child present as soon as the uterus is opened, and the child is quickly extracted. 5. The wound rapidly grows less in size as soon as the uterus is opened. 6. The uterine wound, after the operation, is contained in the pelvis in its greatest extent. He bases his practice on the course of the secondary branches of the uterine arteries which run horizontally, so that a longitudinal incision down the front of the gravid uterus cannot fail to cause free hemorrhage.

¹ Ann. de Gynec. et d'Obstét., Sept., 1897.

³ Centralb. f. Gynäk., No. 398.

² Am. Jour. Obst., May, 1898.

⁴ Ibid., No. 20, 1897.

PATHOLOGY OF THE PUERPERIUM.

Puerperal Sepsis.—Etiology and Diagnosis.—E. Walker¹ gives the causes of puerperal sepsis as follows: 1. Gonorrhea. 2. Retained placenta or membrane. 3. Dirty hands and instruments. 4. Laceration of the cervix and perineum improperly repaired or protected. 5. Intraabdominal disease or tumors. Longyear² claims that the Klebs-Löffler bacillus is a potent factor in the etiology of puerperal infection. In mixed cases of Klebs-Löffler bacillus and streptococcus he would first use the antidiphtheritic serum, and then in 24 to 48 hours begin the use of antistreptococcic serum. J. D. Rawlings³ says that if in the first 3 days of the puerperium the temperature rises without obvious cause to 102° F., and is accompanied by a pulse-rate of 120 or more, the case should be regarded provisionally as septic. T. Wilson⁴ states that the large majority of cases of puerperal infection are due to 3 sets of microorganisms: (1) the pyogenic cocci, especially the *Streptococcus pyogenes* and the *Staphylococcus pyogenes aureus*; (2) the gonococcus; and (3) putrefactive organisms. In the presence of the *Streptococcus pyogenes* there is usually excessive loss of blood; when the gonococcus is found the discharge is markedly purulent; the presence of putrefactive organisms is accompanied by a stinking discharge. Other organisms are found as causes of puerperal infection. Among these the streptococcus of erysipelas and the *Bacterium coli commune* are the most frequent and important. Most of the so-called diphtheritic inflammations of the vulva and genital canal are due to the action of the *Streptococcus pyogenes*.

Ferré⁵ lays stress on the success of intrauterine treatment for puerperal sepsis. This success stands in direct ratio to the earliness of intervention. Hence very careful clinical researches have been made in lying-in hospitals in order to detect true prodromata. The true rigor, local pains, and conspicuous pulse and temperature are known to all, and when combined indicate more or less advanced infection. Ferré denies that these symptoms ever come on suddenly, though certain milder types of infection now observed may represent sepsis modified by antiseptic agents. These milder types, however, will assuredly develop into deadly septic infection if neglected. Ferré finds, after long clinical research, that even the severest form is preceded for a day or two by a distinct elevation of temperature and pulse, and by insomnia. An evening-temperature of about 100° F. in the axilla, with a fall of about a degree in the morning, without a corresponding drop in a somewhat rapid pulse, is a distinctly suspicious symptom. The rise in the pulse often precedes the rise in the temperature; the observer must therefore make sure that acceleration of the heart's action is accounted for even in a patient who seems otherwise convalescent. Reaction after the fatigue of labor, hemorrhage, and emotions all send up the pulse. Insomnia, Ferré has noted, is often observed in the earlier stages of infection; distinct want of sleep without restlessness is usual for a day or two before bad septic symptoms. The lochia may remain free from odor in the premonitory stage of puerperal septicemia, nor are the discharges always fetid when the disease is established.

Puerperal Pseudorheumatism and Gonorrheal Rheumatism.—Béguin,⁶ after careful clinical research, concludes that the so-called "puerperal rheumatism," distinguished by Lorain from acute articular rheumatism in the puerperium, and from the arthritis of puerperal septicemia, is nothing

¹ Jour. Am. Med. Assoc., Aug. 23, 1897.² Ibid.³ Lancet, Aug. 7, 1897.⁴ Birmingham Med. Rev., Feb., 1898.⁵ L'Obstét., Sept. 15, 1897.⁶ Ann. de Gynéc. et d'Obstét., Feb., 1898.

else than gonorrheal rheumatism. Lorain traced it to infection from "normal leukorrhea," or held it to be a direct result of pregnancy and the puerperium. Bégouin contends that the clinical records of the older cases of "puerperal rheumatism" and the bacteriologic reports of more recent cases alike prove that the disease is gonorrheal. It nearly always takes the form of an acute nonarticular arthritis, obstinate, hard to treat, and often ending in ankylosis. These characters are just the same as in typical gonorrheal rheumatism in the male or nonparturient female, while a bacteriologic inspection of the articular fluid and of the genitourinary secretions can finally prove the identity of this disease. Treatment is the same as in nonpuerperal gonorrheal rheumatism. Of course, the discharge itself must be cured; there is little fear that it will be neglected if once detected. Yet though gonorrhea is so perilous to the eyes of the fetus, and though most diseases modify pregnancy or are modified by it, gonorrheal rheumatism seems to have little influence either on pregnancy, delivery, or lactation.

Puerperal Tetanus.—Rubeska¹ states that the earliest date for the onset of tetanus is the sixth, the latest the eleventh, day. It begins in puerperal cases by trismus and dysphagia, and not by tetanic contractions of muscles near the pelvis. He said that Heyse has shown that streptococcus-infection does not predispose to secondary infection of the genital tract by the tetanus-bacillus. According to J. B. Hancock and J. C. Hirst,² the period of incubation of tetanus is an extremely variable one, ranging from 1 to 21 days. The mortality is 89.1%.

Treatment of Puerperal Sepsis.—[The serum-therapy of puerperal sepsis is still on trial, with probably the mass of evidence against it.] Haultain³ says the serum-treatment must be used early and continued after grave symptoms have ceased. Its value is less in mixed than in pure infection. Local antiseptic treatment and the injection of nuclein should accompany it. [Our experience fully coincides with Haultain, that early and repeated use of antistreptococcus-serum is needed to obtain benefit from it. The peculiar virulence of the *Bacillus coli communis* and mixed infection is one of the most important and interesting phenomena in obstetric pathology.] Norris⁴ remarks that the employment of serum-therapy will necessarily be experimental until we learn (*a*) whether a special serum, by some peculiar action upon the body-cells, is capable of inhibiting and destroying the microorganism when present in small or in large numbers, or (*b*) whether the serum is only a chemical antidote to the toxin produced by the microorganism, or (*c*) whether the serum is endowed with both properties. According to H. M. Joy,⁵ nuclein in 5% solution and given in dram doses every 3 hours evidently strengthens nature's antitoxic elements in acting promptly and favorably upon leukocytosis, causing no unpleasant complication or effects, and rapidly diminishing fetid discharges.

E. Corminas⁶ applies to the uterine cavity turpentine or essence of bergamot upon a wad of cotton once daily. Whenever applied the fall in the temperature is constant. Continued irrigation of the uterus, either with sterile salt water⁷ or with solutions of carbolic acid or potassium permanganate, has yielded excellent results. Other methods of treatment are intrauterine injections of steam, curettage, and drainage by means of gauze with a rubber tube and funnel through which alcohol (20% to 25%) is allowed to flow every 4 hours

¹ Arch. f. Gynäk., vol. liv., Pl. I., 1897.

² Edinb. Med. Jour., Aug., 1897.

³ Therap. Gaz., No. 5, p. 296, 1897.

⁴ Univ. Med. Mag., Aug., 1897.

⁵ Univ. Med. Mag., Oct., 1897.

⁶ Jour. Am. Med. Assoc., Apr. 16, 1898.

⁷ Manseau, N. Y. Med. Jour., July 23, 1898.

(*Carossa method*). Internally strychnin, quinin, iron, and cardiac stimulants are demanded.

Herrenschneider¹ strongly believes in the use of proper uterine therapeutics in puerperal fever. He has observed several fatal cases, and found them distinctly traceable to a process of infective inflammation of the endometrium clearly local and manageable at first. He has successfully treated 10 cases, since these observations were made, by intrauterine antiseptic injections, curetting, and, lastly, packing with iodoform-gauze. The latter step is the most important, and should be continued after every injection until the temperature falls to normal. He combats the theory that scraping opens up blood-vessels and lymph-channels, allowing greater chance of the introduction of more septic material. Certainly vessels are wounded, but the tampon prevents the anticipated danger, as it excites normal contraction of the uterine muscle, which tries to expel the foreign body. This therapeutic effect of the tampon is superior to the action of ergot administered with the view of expelling septic fragments and mucus from an otherwise empty uterus. The drug causes uniform contraction of the longitudinal and circular fibers when the uterine cavity is practically empty, so that the os becomes closed. Thus the escape of poisonous mucus is prevented, not assisted. The tampon closes the raw surface of endometrium upon itself and keeps the os open.

J. G. Clark² recommends copious subcutaneous injections of saline solution. J. W. Mills³ enumerates the indications for antiseptic washing out of the uterine cavity as follows: 1. When with a localized tenderness over the uterus there are a high pulse and temperature and a fetid discharge. 2. When with a high pulse and temperature there is any question as to the complete delivery of the placenta. 3. When portions of the membrane have been retained *in utero*. 4. After the birth of a putrid fetus. 5. When the uterus remains abnormally large after labor, with symptoms of septic infection. 6. In all cases in which late in the puerperium symptoms of septicemia develop. 7. In the rare cases in which from acute flexion of the uterus the lochia are retained and decompose. 8. In some imperfect cases of abortion and premature labor, and in all cases in which the uterus has been curetted. 9. In all cases in which the hand has been introduced. Norris⁴ states that within the past 3 years hysterectomy has been proposed for 2 classes of cases of puerperal sepsis: 1. All cases of pelvic infection in which after the removal of a tubal or ovarian abscess there will be left behind in the pelvis infected and infiltrated broad ligaments or a uterus containing areas of infection or suppuration which finally either spread to the peritoneum and cause a fatal peritonitis, or which permit septic absorption to continue until the patient succumbs. 2. The early cases of grave infection going from bad to worse under the usual treatment by curettage, irrigation, and stimulants, in which cases there are no physical signs indicating that the local septic process has spread beyond the womb.

Puerperal Neuritis.—Reynolds⁵ has collected 49 cases, excluding those unilateral cases caused by forceps or exudation into the pelvis. The disease is more common in multiparæ. One-fourth of the cases were during pregnancy, while in one-third there was a history of some form of sepsis. In 11 cases marked and incessant vomiting was present. It was not possible to trace a connection with alcoholism, and sepsis and incessant vomiting are the most potent causes. The disease begins in the legs, then extends to the arms. The muscles are wasted and there are disturbances of sensation. In 14 cases there was either

¹ *Centralbl. f. Gynäk.* No. 46, 1897.

² *Ann. of Gyn. and Pediat.*, Aug., 1897.

³ *Am. Jour. Obst.*, June, 1897.

⁴ *Loc. cit.*

⁵ *Brit. Med. Jour.*, No. 1920, 1897.

no recovery, or but partial cure. In 22 cases recovery was complete, while in 13 no mention was made of the termination. The prognosis is worse when the paralysis is general, and is best in the partial cases. As regards its pathology, degenerative neuritis has been found.

The Presence of Bacteria in the Milk of Nursing-mothers, and their Relation to Mastitis.—Köstlin¹ reports the result of a series of investigations in the clinic at Halle on this subject. He finds that in the majority of cases the secretions of the breast in pregnant and puerperal women, and even in the new-born, contain bacteria. In pregnant women this was true in 86 % of patients examined, in puerperal women in 91 %, and in new-born infants 75 %. With very few exceptions these germs were staphylococci, and especially the *Staphylococcus albus*. In these cases no point of entry for these germs was found, nor any circumstances explaining their presence. They must have entered from without through the nipples, and especially from the areola about the nipples. It has not yet been possible to recognize them in the blood-current. The presence of these germs was harmless to mother and child. The view formerly held, that mastitis depends upon microorganisms, is still correct. The infection in mastitis comes from without, through a lesion in the skin communicating with the lymph-channels, and spreads itself in different ways in the case of different germs. The ordinary form of mastitis results from invasion of staphylococci, especially the *Staphylococcus aureus*. The less common forms of mastitis, such as pseudoerysipelas and retromammary abscess, are caused by streptococci. All means of study of these cases point to common conclusions; mixed infections are possible, and not uncommon; a mastitis caused by metastatic infection through the blood-current has not as yet been clearly proved.

PHYSIOLOGY AND PATHOLOGY OF THE NEW-BORN.

Extravasation of Blood in the Vertebral Canal in New-born Infants.—Schaeffer² finds that in 100 autopsies upon new-born infants, that in 1 in every 10 extravasated blood was found in the vertebral canal, while cerebral extravasations were as frequent as 2 in every 10. Of 17 cases of vertebral bleeding, 41 % followed the use of forceps or extraction in breech-presentation. Some of the children perished during birth; others at varying periods afterward; 24 % of these had other birth-lesions; these were principally lacerations or injuries of the cerebral mass. Of the whole number of children dying, 64 % died of birth-injury; 29 % perished of disease or injury resulting indirectly from birth. It was observed that prematurely born children most often sustain birth-injury, while those born at term develop postpartum diseases. So far as regions of the spine were concerned, in which bleeding was most frequent, in 3 cases extravasation occurred in the medulla; in 2 cases in the cervical region; in 3 cases in the cervical and dorsal; and in 2 in the dorsal and lumbar. These were all in children who had been extracted in breech-presentation. So far as prognosis is concerned, when bleeding occurred into the region of the medulla the child died. The result depended, of course, somewhat upon the amount of hemorrhage, although that did not seem a deciding factor. In asphyxiated children and in premature children any strong mechanical excitement, such as extraction, and, above all, Schultze's manipulation, can cause such hemorrhage. The prevention of this complication consists in warding off all infection during and after labor, and in using those methods of delivery which offer least violence to the fetus.

¹ Arch. f. Gynäk., Band liii., Heft 2, 1897.

² Ibid.

GYNECOLOGY.

By J. MONTGOMERY BALDY, M. D., AND W. A. NEWMAN
DORLAND, M. D.,
OF PHILADELPHIA.

The Year's Work.—On looking over the field one cannot but be strongly impressed with the striking change that has come over the sentiment of the abdominal surgeon during the past few months. The radicalism that has dominated his work heretofore has largely given way to a conservatism that will undoubtedly redound to the welfare of womankind and the human race. The aim to-day is to see not how much can be safely removed, but how many of the pelvic organs can be saved. Hence we see myomectomy supplanting hysterectomy, and vaginal incision and drainage making heavy inroads upon abdominal section. This is a step in the right direction. In the same line organotherapy is coming more into vogue, and inoperable cases of carcinoma and uterine fibroma and the sufferers from the menopausal symptoms, induced or natural, are feeling the benefits of these progressive measures. There is also to be noted a marked improvement in the technic of the various surgical procedures.

PRELIMINARY AND GENERAL CONSIDERATIONS.

Neuroses and Neurasthenia in Women.—J. Braithwaite¹ says that when the process of menstruation is insufficient and painful there are often symptoms which may be said to foreshadow insanity—an irritable and quarrelsome disposition, a marked waywardness, a disposition to despond, and the like; and these symptoms are still more marked when the menses are altogether suppressed. Amenorrhea, there is reason to believe, is frequently one of the causes of insanity; certainly the menses are often suppressed in insanity, and their reappearance is often contemporaneous with recovery. [Is the insanity consecutive to the amenorrhea, or the amenorrhea the result of the poor health which is usually associated with insanity?] The causes of insanity are more or less obviously of an exhausting or depressing character, and insanity is a disease of depression, exhaustion, and irritation. Only in this indirect way is there a connection between mental and nonpuerperal uterine disease. W. P. Manton² concludes that simple melancholia is a disorder incident to the normal brain—that is, there are no organic changes in the cerebral tissues. It is usually the result of a lowered vitality, often with the addition of some mental or nervous strain or toxemia which the economy is in no condition to withstand. In certain instances peripheral irritation from diseased pelvic organs may aggravate the mental disorder and protract the cure. In some cases in which somatic conditions are entirely normal, the local trouble may of itself be sufficient to precipitate the mental manifestations. The prognosis in simple melancholia should never be made until a careful and thorough

¹ Lancet, July 3, 1897.

² Physician and Surgeon, Dec., 1897.

exploration of the pelvis has been undertaken. It is always possible that local conditions may have a decided bearing on the future of the case. E. H. Grandin¹ emphasizes the importance of examining the clitoris, rectum, coccyx, and tubes and ovaries as sources of the various neuroses that are encountered in women. Siredey² describes uterine neurasthenia as appearing in various forms. Generally it is the *depressive* form which dominates. This is sometimes accompanied by melancholia. The *myelopathic* form is not rare, and is characterized by the predominance of rachialgia, by the intensity of the motor weakness of the lower limbs, and sometimes by a certain degree of irritation of the genitourinary organs. Sometimes the neurasthenia assumes a dyspeptic form, in which at times the gastric, at times the intestinal, symptoms predominate. Again, at times the neurasthenia is monosymptomatic, localizing itself in certain regions or in certain organs, and giving rise to functional pains of varying intensity. At other times it is widely diffuse.

Angelucci and Pieraccini³ have published the results of an "international inquiry" into the question of the advisability and efficacy of chirurgico-gynecologic treatment in hysteria and insanity. They received reports of 109 cases in which ablation of the internal organs of generation was undertaken for the cure of hysteria and insanity, or other neuropathic conditions. Only 17 were stated to have been affected beneficially. The remaining 92 were either uninfluenced or affected injuriously. Insanity afterward developed in 44 of these women, 20 of whom had suffered from hysteria before the operation, while 24 had not. Twenty-three others who were insane and hysteric prior to the operation were worse after it. Two not previously hysteric had become so. The remaining 23, who had been in part insane and in part hysteric, remained in the same state after operation. The authors also received reports of 6 cases of hysteria which were favorably influenced by suggestion through simulation of the operation. Of 76 alienists who sent in opinions as to the advisability of surgical interference in hysteria, 56 were unfavorable to such interference, 3 were in favor of it, while the remaining 17 would not commit themselves to an opinion on the question. Of 18 surgeons and gynecologists, 13 were against operative treatment, while 5 were favorable to it under certain conditions. The authors conclude that ablation of the normal uterus or appendages is to be entirely proscribed as a means of cure in hysteric neuroses and insanity; that the existence of hysteria constitutes a contraindication to surgical operation for the cure of gynecologic conditions; and that such operations can only benefit the neuropathic state of the patient through suggestion. They further recommend that in cases in which all known means of combating hysteria have failed, the effect of suggestion should be tried by simulating the operation of laparotomy.

Gonorrhea in Women.—G. G. Van Schaick⁴ says that the conclusions of Noeggerath as to the importance of gonorrheal infection have been fully confirmed. Three years ago he began the investigation of cases of married women suffering from vaginal discharge. In each instance cover-glass slips were made and stained with methylene-blue. Whenever gonococci were not found subsequent examinations were made, at least 3 times, whenever it was possible, and in several patients it was only at the second or third examination that the gonococci were discovered. The writer examined in this manner, during a period of very nearly 3 years, 65 women. Of these, 4 were examined again at an interval of at least a year, and 2 were examined again after an

¹ Med. News, Oct. 16, 1897.

² Gaz. hebdom. de Méd. et de Chir., May 15, 1898.

³ Riv. Sper. di Fren., p. 290, 1897; and Jour. Ment. Sci., Jan., 1898.

⁴ N. Y. Med. Jour., Oct. 30, 1897.

interval of 2 years and over. He thinks the result of his examinations does not represent an absolutely true statement of the condition of things. Cases of gonorrheal infection must certainly have escaped notice. Most women take copious douches before coming to the office, and thus wash out the parts more or less completely, and in many cases gonococci are embedded in the tissues, and for this and other reasons escape detection. Yet such evidence as he can present is positive. All of the women seen complained of leukorrhea, and in 3 only was there any evidence of an acute gonorrheal infection, from the appearance of the vulva, such as to lead to an instant diagnosis of gonorrhea. In others the character of the discharge and the appearance of the parts simply led to suspicion, which was generally confirmed by the microscope. In 4 instances the patients declared that they were aware that their husbands had "something the matter" with them. Among the 65 women examined he found gonococci 17 times, or in 26% of the cases. Nineteen women were examined twice, and in 3 gonococci were found at the second examination. Thirty-two were examined 3 times, and in 3 of these the third examination revealed the cocci. These results tend to show that gonorrhea is a more common disease among married women than is generally believed. They prove the utter futility of mere inspection in making the diagnosis of the disease, and the uselessness, so far as gonorrhea is concerned, of the inspections made in countries where the social evil is partially regulated by medical control. This, however, is now everywhere fully recognized, and the necessity for microscopic examinations has been urged repeatedly.

C. D. Palmer¹ remarks that to what extent the deeper structures of the uterus, tubes, and ovaries become involved varies in different subjects. The specific virus of gonorrhea has an extraordinarily penetrative power, as well as capacity for migration. The superficial layers of the connective tissue are penetrated; sometimes the deeper structures. The upper peritoneum may be invaded by ordinary extension, or general peritonitis may be excited by the bursting of an ovarian abscess or the rupture of a pyosalpinx of specific origin. Many of these patients show in time the gonorrheal cachexia and the general breakdown in health. There is a period in the history of gonorrhea when it becomes a general somatic as well as local disease. Clinical experience and scientific investigation have proved that the disease does remain for years in the system. It is true, beyond controversy, that gonorrhea in the female almost always leads to sterility.

T. Baer² states statistically the presence of rectal gonorrhea in 38.2% of women (429 cases) who had gonorrhea. The most important causes for this rectal disease are the practice of coitus *per anum* and the running over of infectious vaginal secretions in the uncleanly. In uncomplicated cases the mechanical treatment of the rectum with a 2% to 5% solution of silver nitrate produced very favorable results. However, if ulcerative processes or fissures of the mucous membrane are present, milder measures are necessary—iodoform, a 1% silver-nitrate ointment, etc. It may be necessary to excise the ulcer under narcosis.

As regards the treatment of gonorrhea, C. F. Marshall³ says that one of three methods may be employed: (1) The application of lotions, such as silver nitrate, through a speculum to the entire vaginal surface; (2) plugging the vagina with wool-tampons soaked in medicated fluid; (3) medicated pessaries, the best of which are the gelatin-glycerin. W. E. Day⁴ urges the value of hydrozone and glycozone, which he designates as the most powerful healing-agents that he has

¹ Ohio Med. Jour., July, 1898.

² Deutsch. med. Woch., Nos. 51 and 52, 1897.

³ Treatment, Nov. 25, 1897.

⁴ Am. Medico-Surg. Bull., Dec. 10, 1897.

ever used. A. Chaix¹ treats blennorrhagic urethritis by introducing in the urethra a metallic probe to whose tip a pledget of cotton dipped into an ichthyol-glycerin solution (1:5) is fastened. The entire urethra is swabbed out and the vagina is tamponed with the same solution.

Pelvic Massage.—According to J. H. Kellogg,² the following rules should be observed in the practice of abdominal massage: It should not be resorted to until 2 hours after a meal; the bladder should always be emptied just before the sitting takes place. In obstinate constipation an enema should be given and the fecal accumulation removed before manipulations are begun. Should the abdomen be very sensitive, a hot fomentation may be applied as a preliminary; and if the skin sweats freely, sponge with cold water to render it firm and smooth. Pain in and coldness of the extremities after abdominal massage are "due either to bungling or violent treatment, or to extreme hyperesthesia of the abdominal sympathetic." Rubenstein³ gives his observations in 100 cases of pelvic massage. He has reached the following conclusions as to the application of massage in different diseases: 1. Cicatricial parametritis. Here massage is a powerful and, in many cases, the only successful means of treatment. Gonorrhea does not constitute a contraindication to the use of massage under the above conditions. Under the influence of massage, before everything else, patients lose the painful sensations, and following this the distressing pressure-feelings. 2. Exudative parametritis. In this massage forms a good means of treatment, but its usefulness is limited by the duration of time required to attain its aim, and by the care which it is necessary to use in selecting cases for massage, so as to exclude those in whom exacerbation may occur. Hence massage should be avoided (1) when the swelling is distinctly thick in comparison to its extent; (2) when there is increased temperature. Likewise, all more or less extensive swellings are unfavorable for massage. 3. Immovable retroflexion of the uterus. Here massage is a sound treatment. Those cases give the best results in which it is possible to reach the fundus uteri with the external hand in combined examination. After rectification of the uterus the massage should be continued some time. The introduction of a pessary often speeds recovery. 4. In displacement back and to the side the same remarks are applicable as in 1 and 3. 5. Inflammation of the ovaries and the adjacent peritoneum (periophoritis). Massage is very good in oöphoritis, especially when the ovaries are fixed, but the results are very slow in appearing. 6. Chronic inflammation of the uterus and hypertrophy of the cervix are neither of them suitable for massage. 7. Subinvolution of the uterus after labor yields to massage very kindly, but the treatment must be continued some time—on an average one and a half months. 8. Amenorrhea. Massage in certain cases will lead to complete reestablishment without pain, and, as a rule, permanently. 9. Chronic endometritis is not suitable for massage. 10. Mobile retroflexion of the uterus is not very responsive to massage, but in certain cases it constitutes a good method, not too heroic, and fairly successful. In these the indication for further treatment is to be found in the subjective feeling of the patient after the preliminary sittings. 11. In descent and prolapse of the uterus and vagina, and likewise in vaginismus, massage is of no use, and in the latter it is absolutely contraindicated. As regards other diseases of the female genitals—for instance, menorrhagia, dysmenorrhea, local salpingitis or vaginitis—the variety of their causes and the insufficiency of observation have prevented the author from arriving at any practical conclusions. He decides from his observations that the number of sittings varies from 10 to 20, of 4 to 6 minutes' duration,

¹ Am. Medico-Surg. Bull., Mar. 25, 1898.

² Med. News, Dec. 18, 1897.

³ Charlotte Med. Jour., Feb., 1898.

and spreads over from 2 to 4 weeks. Massage of the female genitals is always performed bimanually; and as practically nothing more is required, it is within reach of every medical practitioner.

O. Beutner¹ recommends massage in Trendelenburg's posture for the following reasons: 1. The oblique abdominal muscles are more relaxed. 2. The intestines fall toward the diaphragm, so that massage is easier in fat subjects. 3. Women feel less weary after manipulations in this posture. 4. The uterus and adherent adnexa are carried upward *en masse*, becoming more accessible to the external hand.

Relations of the Rectum and Genital Organs in Disease.—

B. Robinson² remarks that the intimate and close relations of the rectum and genitals in disease may be frequently observed by the gynecologist and the rectal specialist. It is due to the close proximity of the organs allowing the interchange of infectious processes, and to the relation and condition of the veins of both organs. There exists a double venous circulation with valveless veins. The disease in one of the organs produces changes in the other. The reflex action in one organ produces disturbances in the circulation of the other organs, as anemia, congestion, and emigration of microbes or their products. The congestion may also dilate and elongate veins, destroying their healthy spiral condition. The relation is also due to muscular trauma which disseminates the microbes or their products to different regions of the pelvis, and to the fact that neurovascular perforations exist in the partitions between the rectum and the genitals, allowing disease to travel on these lines, especially aided by the surrounding lymph-sheaths.

AFFECTIONS OF THE VULVA AND VAGINA.

Morphology of the Vaginal Segment of the Genital Tract.—

Hart,³ in a paper read before the Edinburgh Obstetric Society, concludes that: (1) The human vagina is derived from the ducts of Müller in its upper two-thirds only. The lower third is due to a blending of the upper portion of the urogenital sinus of the Wolffian ducts. (2) The hymen is formed between the third and fourth months of fetal life, and is due to the development of two bulbs of epithelium from the lower ends of the Wolffian ducts. They coalesce, break down in the center, and with an upward involution from the urogenital sinus form the hymeneal opening. (3) The "canaliculus seminalis" of man is the analogue of the lower third of the vagina. (4) In marsupials the lateral canals are the persistent Wolffian elements, and the central blind pouch is the Müllerian element.

Pruritus of the Vulva.—Herman⁴ divides the cases of pruritus vulvæ into 5 classes: (1) Adventitious, due to pediculi, dirt, worms, pessaries; (2) skin-diseases—eczema, herpes, furuncle, follicular, urticarial, and diabetic dermatitis; (3) irritating discharges—gonorrhea, cancer, senile endometritis, and also cases in which no visible discharge is seen; (4) venous congestion due to heart-, lung-, or liver-disease; (5) nervous. Treatment: Class 1—White-precipitate ointment for pediculi; absolute cleanliness and changing of the material of pessaries. Class 2—Eczema usually affects fat elderly women and those pregnant; possibly it depends on a parasitic microorganism; in diabetes it is especially frequent. In the former warm hip-baths are useful, with liquor carbonis detergens (Wright's) added, together with powdering the parts with boric acid. In the latter general treatment is required. Herpes zoster is not amenable to

¹ Centrallbl. f. Gynäk., No. 19, 1897.

³ Lancet, June 27, 1897.

² Med. Rec., Feb. 12, 1898.

⁴ Brit. Med. Jour., Nov. 20, 1897.

treatment. Follicular pruritus is best treated by squeezing out the contents of the follicles and applying corrosive sublimate, 1 : 2000. Urticaria is very rare. Class 3—Sedative and antiseptic washes to the vagina, with sedative powders to the vulva, as a saturated solution of borax and dermatol powder and boric acid. When these fail, a strong carbolic lotion, 1 : 7, is useful. Class 4—The treatment is the same as just given, together with general treatment. Class 5—Pruritus in aged women is sometimes a symptom of degenerative changes in the nervous system, and treatment usually fails.

Vulvitis and Vaginitis.—J. M. Jackson and J. H. Wright¹ describe the condition known as *kolpitis emphysematosa*, first mentioned by von Winckel under the name of *kolpohyperplasia cystica*. The disease is characterized by an eruption of gas-containing cysts in the vagina. It occurs with greater frequency in the pregnant than in the nonpregnant. Nothing is known of its etiology; but there is nothing to point to its being an acute inflammatory process. The only symptoms which have been noted are a smarting sensation high up in the vagina and a slight leukorrhea. The symptoms are so slight that the condition is often overlooked, and most of the cases have been discovered by accident. The process is, for the most part, confined to the upper two-thirds of the vagina and to the cervix. The nodules appear singly and in groups, varying in size from a pin's head to a split pea. They look like small vesicles or cysts. The mucous membrane covering them is pale and very thin, while the surrounding tissue is normal or slightly injected. The nodules contain gas, or gas and a small amount of serous fluid. The gas, according to Carl Ruge, is to be found in the spaces of the connective tissue. Eisenlohr believes it to be due to microorganisms in the connective tissue. Another theory is that there is a marked dryness of the vagina, a gluing together of the minute folds of the vagina, thus sealing up a certain amount of fatty matter, a breaking down of this encapsulated material, and the formation of gas. Chiari states that the gas is developed in the dilated channels of the lymphatic system, probably in the lymph-capillaries.

W. Ilkewitsch² gives an account of his experiments with lactic acid in the treatment of vaginitis and endometritis. He bases his claim for the therapeutic value of this agent upon the following observations made by himself and other clinicians: The acidity of the vaginal secretions is due chiefly to the presence of lactic acid, which is either a product of the *Bacillus dæderleini* or of the physiologic activity of the vaginal walls, or both. He lays stress upon the fact that in 99 out of 100 cases, when the vaginal secretions are distinctly acid, pathogenic microorganisms cannot be found therein; or, if so, their virulence is markedly impaired. In the secretions of the normal vagina of a pregnant woman 0.4% of lactic acid was found. The growth of the *Streptococcus pyogenes* was inhibited when the bouillon-culture contained 0.1% of lactic acid, though the *Staphylococcus pyogenes* required 0.4% before it succumbed. The author irrigates the vagina with about 800–1000 c.c. of a 3% aqueous solution, and claims to effect therewith a complete destruction of all microorganisms present. To cervical erosions and uterine mucosa he applied the remedy in strengths varying from 50% to 100%. From a careful study of a limited number of cases he draws the following conclusions: (1) That the topical application of lactic acid to the endometrium markedly diminishes the amount of fluor albus; (2) that irrigations of the vagina with a 3% solution destroy saprophytic and pathogenic organisms and cure kolpitis; (3) that the same solution removes unpleasant odors; (4) that it changes the color of the discharge from yellow-green to white; (5) that it is a safe remedy in ambulatory cases,

¹ Boston M. and S. Jour., July 28, 1898.

² Arch. f. Gynäk., Oct. 30, 1897.

even with an existing salpingoöphoritis; and (6) that the remedy will, in many cases, replace curettage.

In writing of **vulvovaginitis in children**, Marfan¹ describes the complications of this inflammation, which may be threefold—viz.: 1. Inflammation of Bartholin's gland, phlegmonous vulvitis, and rectal blennorrhœa; and often urethritis, which may even become hemorrhagic. Metritis, salpingoöphoritis, and peritonitis may occur. All these are due to direct extension of the inflammation. 2. Gonorrheal ophthalmia, or infection by contact. 3. General infection, as gonorrheal rheumatism, which may develop as early as the ninth day and involve one joint only, especially the knee, lasting about 2 weeks. It may be fatal in the new-born. Endocarditis and pleuritis are possibilities. The writer speaks highly of irrigations with potassium permanganate, 1:1000; or, if this fails, with sublimate, 1:10,000; resorcin, 1:100; or silver nitrate, 1:3000. He also recommends the introduction of pencils containing iodoform and alum.

Mejia² calls attention to the fact that in rare instances diffuse peritonitis may result from extension of a vulvovaginitis upward to the uterus and tubes. The prognosis is nearly always unfavorable. The diagnosis is difficult, but the condition may usually be inferred in a case of gonorrheal vulvovaginitis in which violent diffuse peritonitis develops, appendicitis being excluded. Abdominal section offers the only prospect of saving the patient, and must be performed as early as possible.

In the treatment of vulvovaginitis, M. Storer³ remarks that a host of local remedies have been tried, and most of them with but little success. The dry-packing treatment, sometimes of such value in the treatment of adult gonorrheas, is not applicable to many children; and perforce we must depend upon injections and suppositories. The injection perhaps most frequently used has been corrosive sublimate in solutions varying in strength from 1:10,000 to 1:500; but dissatisfaction with this has led to the use of many other antiseptics and astringents, such as lysol, creolin, carbolic acid (which is especially objectionable from the danger of poisoning), thallin, zinc sulphate (even to the strength of 5% daily (Küssel)), douches of silver nitrate in weak solution (1:5000), or injection of a small amount of strong solution (1:50). Painting the vagina with ichthyol or iodine has had its advocates. Pott advised bougies of iodoform; Comby, of salol; Pozzi, the insufflation of iodoform. Marfan uses bougies of alummol, 3%. Cassel uses bichlorid, 1:1000, for 3 weeks, and then applies 1% to 5% silver nitrate 2 or 3 times a week. Martin advises the injection at first of a 1% solution of sodium bicarbonate twice a day, then of bichlorid, 1:10,000, to which is added after a few days 1 part in 20 of extract of hydrastis, or else the injection of silver nitrate (1:6000). Storer prefers the use of graduated solutions of potassium permanganate, starting with $\frac{1}{2}$ gr. to the pint (1:16,000), and increasing the strength by $\frac{1}{2}$ gr. every third day at first, and after the ninth day daily. Whatever local treatment be employed the child should be kept in bed during the acute stage. Walking is generally painful; in fact, it is often the waddling gait that first attracts attention to the trouble. Whether the urethra be involved or not, the child should be encouraged to drink freely of water, and should be given mild diluents or balsams—say, ol. santali, 5 drops t. i. d.—which will at least render the urine less irritating to the inflamed vulva. If the inflammation be marked, it may be well to allow the child to urinate in a warm hip-bath. Nervous children will sometimes hold their water much longer than is desirable, from dread of pain, and

¹ Abeille m  d., No. 16, 1897.

² Gaz. hebdom. de M  d. et de Chir., No. 29, 1897.

³ Boston M. and S. Jour., Jan. 20, 1898.

such cases can sometimes be helped greatly with cocain. The genitals should be kept clean with hot boric solution, which should be used several times a day, and, if necessary, pain should be calmed by sedative washes like that of lead and opium, or by hot, mildly antiseptic compresses. The bowels will, of course, be kept open, partly on general principles and partly to lessen pelvic congestion; in fact, a laxative will often be quite enough to stop the discharge in some of the catarrhal cases. Injections are to be avoided during the acute stage, except, perhaps, one of warm salt solution or of sodium bicarbonate, if the discharge be very copious. The introduction of anything between the inflamed labia is painful, and strong injections only aggravate the discharge.

Adhesion of the Female Prepuce.—Bacon¹ concludes from his observations and experience that preputial adhesions in the female may produce two different effects: (a) An irritation leading to masturbation, and various neuroses; and (b) prevention of development of the glans clitoridis, resulting in an eroticism. The reflex nervous centers of the child being less under the control of the inhibitory impulses than in the adult, peripheral irritation gives rise to nervous manifestations in the former which in the latter would have no effect. As preputial adhesions in the female are capable of setting up as grave nervous symptoms as the like condition in the male, Bacon is of the opinion that every female child should be examined and the clitoris liberated at the same period that this or circumcision is undertaken in the male—that is, some time immediately following the separation of the navel.

Primary Tuberculosis of the External Genitals.—E. Paoli² believes that primary tuberculosis of the female external genitals is not so rare as the literature of the subject would seem to show. It occurs not only in infancy, but also in adult life. Many cases of so-called vulvar esthiomène, rodent ulcer, vulvar elephantiasis, and polypous productions are really of tuberculous nature. The infection may be by direct inoculation, as by the sexual act. The lesions are, first of all, localized in the neighborhood of the meatus urinarius and clitoris, and spread slowly to the surrounding parts. Clinically this form of tuberculosis in adult life is characterized by the association of more or less extended ulceration, with an elephantiasic thickening of the labia majora and minora and the clitoris. It has a slow course, and may long remain localized in the external genitals. Diffusion of the process to the inguinal lymphatic glands is not so common as might be expected. Histologically the tuberculosis is marked by extensive inflammatory infiltration around the specific lesions, by abundant vascularity of the altered tissues, by the rarity of caseous change, by the tendency to spontaneous repair, and to cicatricial retraction of the tissues. Secondary tuberculosis of the female external genitals in the adult has a more rapid course and a greater local malignity, with a greater tendency to lymphatic glandular involvement. Energetic surgical interference will in this region give a complete cure. Resection of large portions of the urethra may be practised without disturbing the process of micturition.

Vaginal Cysts.—According to W. R. Lincoln,³ vaginal cysts are usually found in the lower third of the vagina, and decidedly more often on the anterior than on the posterior wall. They are usually of quite slow growth, but any cause which brings about an increased blood-supply or an irritation in the tissues may accelerate the rate of growth. Pregnancy and childbirth may cause the cysts to increase rapidly in size. They are generally sessile; the formation of a pedicle is to be regarded as a secondary process. They usually

¹ Am. Gyn. and Obst. Jour., Mar., 1898.

² Atti e Rendiconti della Accad. Med.-Chir. di Perugia, No. 1, 1897.

³ Cleveland Med. Gaz., Feb., 1898.

possess a distinct cyst-wall and a lining layer of epithelial or endothelial cells. The epithelium in some of the cysts is of the single-layer, columnar, nonciliated type; in others it resembles that of the vagina; in others both types are to be found in the same cyst. Some cysts are lined with endothelium. Von Preuschen believes that vaginal cysts are merely retention-cysts caused by the obstruction of vaginal glands. He describes these vaginal glands, and quite a number of authorities support him in his belief as to the existence of such structures in the vagina. The weight of authority is, however, probably against their existence. Freund suggests the possibility of the origin of these cysts from a portion of an imperfectly developed Müller's duct. Froment believes that the cysts are caused by a retention and increase of secretion in adventitious cyst-cavities formed in the depression between the agglutination of the crests of two or more adjacent folds of the vaginal mucosa. Veit believes that in most cases these growths are really due to a cystic distention of a part of Gärtner's duct. Some authorities believe that many of these cysts arise from dilated lymph-spaces, and the presence of an endothelial lining in some of the cysts tends to bear out such an explanation of their source in such cases.

Prolapsed Vaginal Walls.—Marsi¹ describes the following operation for cystocele: A longitudinal incision is carried through the mucous and sub-mucous layers of the anterior vaginal wall, from the anterior fornix to the lower end of the urethra. At each end of this incision a small transverse one is made on either side, and the two lateral flaps thus marked out are dissected off. Interrupted sutures of catgut are passed through the base of the right-hand flap, beneath the median raw surface, emerging at the base of the opposite flap. The flaps are then replaced over the first line of sutures, and their opposite edges are united by a continuous suture of catgut. The result is not only the removal of redundant tissue, but the formation of a new supporting column in the median line of the anterior vaginal wall.

Perineorrhaphy.—Browning² gives "A contribution to the knowledge of the anatomy of the levator ani muscle." He is opposed to the generally accepted view "that the levator ani is the principal support of the pelvic contents of woman," and he gives several important reasons for this statement: (1) That in the human subject it must be considered as belonging to a rudimentary class; (2) that from the weakness of its mode of origin and insertion its value is overrated; (3) that it is contrary to physiologic tenets that a muscle gives continuous support; (4) that, if intact, the rectovesical fascia is quite sufficient to give the necessary support; (5) that the muscle in the male is equally as well developed as in the female.

In operating for the repair of a lacerated perineum, J. R. Goffe³ has adopted a new method of procedure. He makes a triangular denudation up the posterior vaginal wall by incisions from the caruncle on either side of the vulvar opening to the crest of the rectocele, while a curved incision below from one caruncle to the other follows the line of the mucocutaneous juncture. All the mucous membrane within these incisions is removed, the denuded surface corresponding very closely to that described in the Hegar operation. The point of originality consists almost exclusively in the manner in which the stitches are passed. Instead of being passed through the skin, as in Hegar's operation and also in that of Emmet, they are inserted in the mucous membrane of the vagina, and take their points of support from the fasciæ, thus lifting the rectocele and the anus instead of dragging them down,

¹ Centralbl. f. Gynäk., No. 38, 1897.

² Med. News, June 12, 1897.

³ Ibid., May 28, 1898.

as is true of the operations mentioned. Silver wire, No. 25, is used for the purpose. The stitches are directed from above downward and from within outward. The last suture surrounds the edges of so long an incision that these margins will usually be found to gape a little along the line from the point of insertion of the last stitch to the bottom of the fourchet. To secure primary union and prevent the secretions entering this little gap, it becomes necessary to insert 1 or 2 superficial silk or catgut sutures at this point. W. H. Hamiston¹ recommends cocain-anesthesia in perineorrhaphy. The maximum quantity used is 50 minims of a 2% solution, equal to a dose of 1 gr., used hypodermically in the margins of the area of operation.

CONDITIONS OF THE CERVIX UTERI.

The Surgical Treatment of Catarrhal Erosions of the Cervix in the Nulliparous Woman.—Munde² declares in favor of operative treatment in catarrhal inflammation of the endometrium producing hypertrophy of the glands and papillæ of the mucous lining of the cervical canal sufficiently powerful to force apart the lips of the virgin os, sometimes even producing an eversion similar to the actual parturient laceration of the cervix. This condition, which is not an uncommon one, must not be mistaken for congenital fissure of the cervix, as described by Fischl and Penrose, or for the congenital erosion reported by Leopold and Ahlfeld. The disorder, described in the older books as "granular and cystic degeneration of the cervix," is the result of chronic endometritis, and is exceedingly difficult to cure by the ordinary methods. The operative technic, as described by Munde, consists, "after curetting the whole endometrium (the sharp curet in the cervical cavity), in excising with slightly curved sharp scissors or sharp, slender knife the entire diseased tissue to the depth of $\frac{1}{2}$ in. in a converging direction." The raw surfaces are then brought together by deep silver-wire or other sutures, and a thin strip of iodoform-gauze is carried through the cervical canal and into the uterine cavity. The gauze is changed every 48 hours for a week or 10 days, and afterward, at intervals of a week or two, Peaslee's sound should be passed to prevent cicatricial contraction of the os and cervical canal.

Sphincteric Hysterotomy.—Defontaine³ describes an operation for free division of the uterine cervix, intended not merely as a preliminary measure in removal of an intrauterine tumor, or to facilitate exploration of the uterine cavity, but for the purpose of abolishing the functions of the sphincter, and, consequently, of modifying the physiologic and pathologic conditions of the uterus. Division of the sphincter, it is held, is more effectual than amputation of the cervix in causing involution of the uterus, and, consequently, of ameliorating certain forms of metritis and of uterine deviation. Sphincteric hysterotomy, the author states, is indicated in cases in which it is necessary (*a*) to assure evacuation of the contents of the uterine cavity; (*b*) to facilitate involution of the uterus; and (*c*) to prevent the upward extension of any infective process toward the oviducts. It is regarded as a measure of radical treatment in cases of metritis and of affections of the uterus complicated by septic inflammation, particularly uterine flexions and dysmenorrhea of uterine origin, and also advanced retraction of the cervix. It acts by allowing complete evacuation of the uterine cavity and by facilitating involution of the diseased organ. The operation, which is considered as quite a harmless one, has had good results after failure of dilatation of the sphincter and curetting.

¹ Va. Med. Semi-monthly. Nov. 12, 1897.

² Am. Jour. Obst., May, 1898.

³ Arch. Prov. de Chir., No. 2, 1898.

It should be practised only in cases in which the expectation of conception no longer exists, or when the gravity of the affection leads to a disregard of inconvenient consequences in this respect. It is stated, however, that an autoplasmic operation may in certain cases reestablish the uterine sphincter and favor the possibility of pregnancy.

Amputation of the Cervix Uteri.—W. R. Pryor¹ states that this operation is indicated whenever there exists disease of either the cervical mucous membrane or cervical tissue proper which does not yield to local applications. Because cervical disease is more frequently found in women who have born children, the application of the operation will be most often in such; but it is not to be limited to parous women. The presence or absence of laceration is not important. The conditions under which we most often see the indications for this operation are hypertrophy of the cervix, bilateral laceration, and cystic degeneration. By this operation as little or as much of the cervical tissues can be removed as is desired, and provision made for a new cervical canal which will be of normal size. Pregnancy resulting after the operation is not interfered with and labor progresses normally. The cervix is not torn at subsequent deliveries. Audebert² differs with Pryor in this respect. He states that amputation of the cervix exercises an important influence upon subsequent pregnancy, frequently leading to abortion or premature delivery. During labor the membranes are prone to rupture prematurely, while in some cases the cicatricial tissue opposes an absolute impediment to dilatation, requiring multiple incisions to overcome it.

T. A. Emmet³ states that it has been 35 years since he first practised what is known as Emmet's operation for the repair of the cervix uteri. The necessity no longer exists, in this country at least, for the author of it to stand on the defensive. The verdict stands that in appropriate cases better results can be obtained through its agency than by any other operation. It is only in those cases which are exceptions to the rule, and cannot be cured by preliminary local applications and Emmet's operation, that he advocates amputation by the method described in his book. Some women have not the time or the means to undergo the long preliminary treatment required for softening the cervix, etc., in the simpler operation. In others the cicatricial and diseased tissue extends so deeply into the cervix that even prolonged local and general measures (not operative) will not put the cervix in condition so that the lips can be brought together after all diseased portions have been removed. It must not be inferred, however, that he is not as strong an advocate as ever of a conservative course, that of saving the cervix whenever possible. The uterus is drawn gently to the vaginal outlet, and held there steadily by an assistant; the arteries thus stretched are narrowed and the hemorrhage is much diminished. It is important, too, as the excavation goes on, for the assistant to draw successively upon the tissues to be cut, as in this way the hemorrhage, which otherwise would be excessive, will be slight. The cervix is taken out cone-shape. One should not go out as far as seems safe, otherwise there will be too great retraction and possible injury of the peritoneum or bladder. As the operation proceeds, the bottom of the cavity must be kept at the vaginal outlet. To obviate closure of the uterine canal by contraction of the tissues, and leaving a cicatrizing surface upon the uterine stump, he draws vaginal tissue over the stump from opposite sides and secures it permanently upon its surface. The cervical canal is left fully open. A silver suture is passed from the required point on the vagina inward through the stump, stopping short of the central

¹ N. Y. Polyclinic, July 15, 1897.

² Ann. de Gynéc. et d'Obstét., Jan., 1898.

³ Charlotte Med. Jour., June, 1897.

opening; a similar one on the opposite side; others, one or more, in opposite surfaces on both sides of the cervical stump, and all are properly tightened after the uterus is first replaced in a normal position. The sutures are removed about the twentieth day. No operation gives better results in cases suitable for it.

FISTULÆ.

Vesicovaginal Fistula.—H. O. Marey¹ contends that the circular fibers of the vaginal mucous membrane are responsible for the majority of failures to cure vesicovaginal fistulæ. To obviate this he first freshens the edges of the fistula, then splits the edges, and separates widely the bladder from the vagina. When this is accomplished, the bladder-aperture is freshened and united by a double row of continuous sutures of fine tendon, care being taken not to penetrate the mucous membrane. This is particularly applicable where a large portion of the vaginal vault has been lost, rendering approximation of the bladder-wall comparatively easy and of uniform tension. The vaginal mucous membrane is then closed. [Mackenrodt, of Berlin, in 1894, advocated a free dissection not unlike that which the author has described, after which he united the wound in the bladder with fine silkworm-gut sutures. Then he closed the vaginal wound by drawing the body of the uterus forward, so as to give the parts, as far as possible, a support from this organ. Schauta, in adherent vesicovaginal fistula, advises a vertical incision, lateral to the left labium majus, dissecting down to the descending ramus of the pubes; separation of the cicatricial tissue, walls of the vagina, and fistula from the bowels by means of a periosteal elevation as far as the obturator foramen. Ferguson advocates the following method of closure: The fistulous opening being exposed, an incision is made through the mucosa of the vagina at the distance of a full $\frac{1}{8}$ in. from the opening of the margin of the fistula. This incision is extended until it completely encircles the opening. The line of the incision is carefully deepened until the lining membrane of the bladder is reached, and great caution is exercised in retaining the integrity of that membrane. In this manner a circumfrontal flap, hinged by the mucosa of the bladder, is obtained. This flap is inverted into the bladder and held in position by a continuous catgut suture. There is no loss of tissue, and a very broad surface is obtained for apposition. Walcher advocated cutting away all tissue, and without making it apparent as to the purpose, he evidently frees the bladder from its vaginal attachments and unites the bladder-wound with catgut sutures taken $\frac{1}{4}$ in. from the edge of the fistula. After these have all been inserted they are tied. The bladder having been thus closed, the vaginal flaps are united by a line of silk sutures. Kelly reverses in large measure this very process by dissecting the bladder from behind forward from its uterine attachments quite beneath the reflected peritoneal fold, and in this way is enabled to draw the posterior wall of the bladder downward by a layer of fine interrupted silkworm-gut sutures passed inferiorly through the bladder-wall and its vaginal attachment. He emphasizes the importance of catheterization of the ureters prior to operation upon large vesicovaginal fistulæ.] Marey claims for his method the following advantages: The ureters are not involved; the uterus is not included as a factor of repair; the method is easier to apply when the destruction of tissue is so great as to include the upper part of the urethra. This the author believes to be important, but it does not seem to him that union of the posterior bladder-wall with the anterior vaginal wall is ever to be advised when lateral approximation upon the median line can be effected. The advantages he claims for

¹ Jour. Am. Med. Assoc., Nov. 20, 1897.

his method are apparent. It is based: (1) On the anatomic and physiologic relationship of the approximated organs; (2) on the comparative ease of operation made possible by a free dissection; (3) on the far greater possibility of cure of large vesicovaginal fistulæ when a considerable portion of the vaginal tract has been lost; (4) on the great advantage obtained from the lateral approximation of the structures in the median line; (5) on the fact that by the use of aseptically buried tendon-sutures the parts are held at rest in apposition and primary union follows, with no subsequent care of the wound and no removal of sutures.

Uterovaginal and Ureteroabdominal Fistulæ.—A. H. Ferguson¹ has collected 65 cases and observed 2 cases himself, making 67 cases in all. Of this number, 60 were uterovaginal, 4 ureterouterine, and 3 ureteroabdominal. This collection does not include fistulæ from the kidneys, nor the ureterolumbar and ureteroinguinal varieties. No cognizance was taken by the author of the various primary operations performed on accidentally injured ureters while operating upon the pelvic organs. The ages of the patients varied from 19 to 64 years, excluding those having the congenital forms. He concludes that: 1. The left ureter is more frequently the seat of trouble than the right. 2. The most frequent variety is the uterovaginal, and the rarest is the ureteroabdominal. 3. The most common cause is difficult labor, and forceps-delivery is a prominent etiologic factor. 4. Of all the operations performed in the pelvis, vaginal hysterectomy is the most frequent cause of ureteral fistula. 5. Other conditions being favorable, all cases of ureteral fistula are curable by operation. In all cases of uterovaginal fistulæ the direct method of operating should be selected, and no particular operator's method is applicable to all cases. When the ureteral opening is situated close to the bladder Schede's operation is the most surgical, and is applicable to the greater number of cases; when situated far away from the bladder, a plastic operation may be tried before a graver and more mutilating procedure is thought of. Intraperitoneal operations are suitable for abdominal fistulæ. 6. For the cure of uterovaginal fistula, hysterectomy, nephrectomy, and colpocleisis are, in the author's opinion, entirely unjustifiable procedures. When septic infection of the kidney occurs it may be necessary to open or remove it. It bespeaks lack of surgical ability to remove a kidney or uterus or close a vagina in these cases of simple fistulæ. 7. Another procedure which the writer thinks uncalled for is transplanting of the cervix uteri into the bladder for the treatment of ureterouterine fistula, for it causes sterility, and the menstrual flow is abnormally directed; and, besides, a disturbed bladder might cause a backward flow of urine into the uterus, Fallopian tubes, or even peritoneal cavity, depending upon the condition of the organs. 8. Directing the urine into the bowel is only justified when any other operation cannot be performed. While ureteroenterostomy has been successfully performed, it has but little to recommend it on general principles.

URINARY ORGANS.

Urethra.—Prolapsus of the Female Urethra.—[This trouble is rare, there being only from 100 to 120 cases on record. It sometimes occurs during a coughing paroxysm in pertussis. Various methods of treatment have been devised, but the use of the knife is frequently followed by stenosis, and in 1 case by death. Emmet's "buttonhole" is not advisable on account of the fistula left and the double operation. Kleinwächter's method of slitting

¹ Am. Jour. Med. Sci., vol. xxx., No. 15, p. 863, 1898.

the urethra and suturing the beginning of the prolapsus to the base is only applicable to partial inversion]. Wohlgenuth¹ claims that Israel's method is effective, simple, and permanent in its results. The protruding mucous surface is cauterized in narcosis with the Paquelin in a radiating series of burnt strips lengthwise of the urethra, through the entire thickness of the mucosa. The cicatricial contraction that results puts an end to the prolapsus. Two applications may be necessary. W. S. Bagot² concludes that the instances described as complete or annular prolapse of the urethral mucous membrane are rarely, if ever, instances of true primary prolapse of the membrane, but are due to some neoplastic change in the membrane, probably of the nature of an angioma.

The Bladder.—Cystitis.—Karger,³ from a careful analysis of 46 cases, arrives at the conclusion that cystitis (with certain rare exceptions of chemical or toxic origin) is always due to microorganisms, the *Bacterium coli commune* being the most common. The mucosa of the bladder, however, must previously be in a condition favorable to infection. The existence of so-called "catarrhal cystitis" is doubtful. Ammonuria is of secondary importance; in the majority of cases the reaction is acid. True gonorrheal inflammation of the bladder is always caused by Neisser's coccus. The prevention of cystitis lies in the maintenance of absolute asepsis of the meatus urinarius, as well as of the urethra. A 4% solution of silver nitrate is the best remedy in inflammation of the bladder.

Prolapse of the Bladder in the Female.—Kleinwächter⁴ has collected only 18 cases from the literature, to which he adds another. Nine occurred in children, 8 cases being those of complete prolapse through the urethra. The accident occurred suddenly, in consequence of violent abdominal pressure, or gradually. The diagnosis is not usually difficult. The treatment consists in replacing the inverted organ under anesthesia, after which pressure is maintained against the neck of the bladder by means of tampons, the patient being kept perfectly quiet for several days. In adults the catheter should be used regularly. In the latter a pessary may later be substituted for the tampon, or, if this fails to prevent a recurrence of the prolapse, ventrofixation of the bladder may be practised. Of the cases reported, 11 recovered without an operation; 4 of the others died, 2 of uremia.

Ureter and Kidney.—Catheterization of the Ureters.—According to Winter,⁵ the chief indications for the use of ureteral catheterization in women are: (1) In kidney-diseases, particularly pyelitis; also in tuberculous kidney. Examining the condition of the remaining kidney when one has been excised. (2) Examining for renal calculus and other conditions; Casper's ureter-cystoscope is used, and catheters of the French type. The idea of obtaining a view of the whole urinary apparatus is, no doubt, an excellent one. It requires immense patience and perseverance to become an efficient observer with the cystoscope; this is probably the reason that it is so little used.

E. Reynolds⁶ states that of the various methods of ureteral exploration of the kidneys in women, the study of the separated urines of the two kidneys takes the chief place, and furnishes us with a method of physical examination of the kidneys which is so accurate and safe, that the ureteral catheters occupy to the surgery of the kidneys in women much the same relation which the stethoscope has so long held to the medical diseases of the chest. The importance of this examination rests upon the fact that it enables us to isolate

¹ Deutsch. med. Woch., Nov. 4, 1897.

² Centrallbl. f. Gynäk., No. 2, 1898.

³ Ibid., Band xxxvi., Heft. 3.

⁴ Med. News, June 5, 1897.

⁵ Zeit. f. Geb. u. Gynäk., Band xxxiv., Heft 2, 1898.

⁶ Boston M. and S. Jour., Mar. 17, 1898.

the disease and to determine with certainty not only which kidney is affected, but exactly what the condition of each kidney is. The points which are especially worth emphasizing are: (1) The symptoms may be transposed—that is, the pain and tenderness may be referred by the patient to the comparatively sound kidney; (2) there may be a transitory inflammatory affection of the sound kidney, which should lead us to defer operation until it has passed away; (3) the choice between nephrotomy and nephrectomy, and sometimes the decision as to whether any operation is or is not permissible, should be decided by a comparison of the relative condition of the two kidneys; (4) in cases of renal calculus the question between nephrolithotomy and nephrectomy must depend largely upon whether the condition of the affected kidney affords a prospect of good healing and a useful kidney after nephrotomy.

The Sources and Diagnosis of Pyuria.—According to H. A. Kelly,¹ the urethra furnishes 3 possible sources of pus in the urine: (1) Skene's glands, in which it may be detected by pressing them up under the pubic arch and squeezing downward and outward; (2) a urethritis or urethral ulcer, in which a two-glass test shows pus in the first portion of urine passed and the second clear; (3) suburethral abscess. The vesical sources of pyuria are: (1) Cystitis and trigonitis, (2) foreign body, (3) ulcer; all of which may be diagnosed by examination through a cylindric cystoscope, with the patient in the knee-chest posture. It is particularly important to let air into the vagina before dilating the bladder. Extravesical sources of pyuria include inflammatory diseases of the Fallopian tubes, extrauterine pregnancy, acetabular or psoas abscess, abscess from the vermiform appendix, cystitis from intestinal fistula, and extension of carcinoma from the uterus. The presence of extravesical abscesses which have ruptured into the bladder may be shown by finding a red, mammillated, edematous mucosa surrounding the opening. The situation of a pus-focus in the ureter or kidney may be discovered by inspection of the ureteral orifice, which will be intensely reddened, mammillated, or ulcerated; or by passing ureteral or renal catheters, this method showing the exact location of the infection in the upper urinary tract, whether in the ureter or kidney. If pus in the renal pelvis is too thick to flow through the catheter, it may be thinned by injecting boric-acid solution, and in some cases by manipulating the kidney between the hands. The nature of such a pyelitis must be determined by bacteriologic examination of the pus, by investigation for a history of previous hydronephrosis, and examination for the presence of a calculus. If there is a stone in the kidney, the catheter may bring down fragments; and if its end is covered with a mixture of dental wax and olive-oil, the latter will be scratched by contact with the stone. When tubercle-bacilli are found in urine taken from the upper urinary tract, their source is usually the renal substance.

Movable Kidney.—G. McNaughton,² reviewing the history of movable kidney, states that while the condition has long been recognized, it has as yet received too little consideration at the hands of the profession. The chief symptoms are those of digestive disturbances, pain near the lower border of the ribs, generally to the left of the median line, and nervous manifestations. The diagnosis of movable kidney is easy in the majority of cases. The patient should be placed on the back, with legs and thighs moderately flexed. The physician then lightly grasps the side just between the lower rib and iliac crest, with the thumb in front and the fingers behind. The patient is directed to take a long breath, when the kidney, if loose and not too tightly held, will be felt passing between the fingers and thumb. The parts should then be more firmly grasped, and the kidney palpated with the other hand and made to slip

¹ Med. News, Dec. 11, 1897.

² Brooklyn Med. Jour., Feb., 1898.

back to its normal position. Regarding treatment, the author says that ordinary support of the kidney, by means of a belt properly adjusted while the patient is on the back, is all that is required in the majority of these cases. The amount of pressure necessary to hold a kidney in place is very slight. Means should also be taken to increase the amount of adipose tissue around the kidney. McNaughton deprecates the frequent resort to surgical interference in these cases, and finds that very often the operation of "anchoring" is not only unjustifiable, but may leave the patient in a worse condition than previously existed.

L. A. Bidwell¹ remarks that two different forms of movable kidney are usually described: In the first variety the organ is freely mobile and forms a definite abdominal tumor, the term "floating kidney" being used for this condition; in the second variety the organ can be displaced to only a small extent, and the affection is called "dislocated kidney." The symptoms of these two forms vary considerably, and it is often found that they are more severe in the cases in which displacement is least marked.

MENSTRUATION AND ITS DISORDERS.

The Glandular Function of the Uterus.—J. H. Keiffer² has studied the glandular function of the uterus—that is, its utility in the organism as an excretory organ, eliminating toxic products in its function of menstruation. This idea is not altogether a new one, but is practically ignored in most text-books on physiology and gynecology. We are accustomed, of late, to think of a possible extragenerative function of some of the organs of reproduction; the testicle and the ovary are supposed, with some reason, to furnish an internal secretion that has its purpose and value in the systemic economy; but the uterus is not so commonly regarded in a similar light, and menstruation has been considered as a result or attendant of ovulation, and therefore purely an incident of the generative function, perhaps a quasipathologic result of a somewhat abnormal human evolution. The glandular structure of the uterine mucosa has been credited with merely furnishing the needed mucous secretion of such an internal cavity suited to its special reproductive function. The disturbances noted as following disorders of the menstrual function are many of them such as would naturally suggest an auto-intoxication; but it has been customary rather to refer them to some obscure reflex influence than to poisoning by retained products, notwithstanding the fact that an actual excretion normally occurs. Keiffer's argument is based on an experimental study of the relations of the muscular and vascular apparatuses and the mucosa, his observations having been made both on the human female and experimentally on the dog in the condition of rut, and he finds that while the arrangement of blood-vessels is such as to indicate that the nutrition of the epithelial tubes of the uterine mucous membrane is of the very first importance, the function of the latter does not seem to be exclusively limited to the production of mucus or mucin. There is, as was well known before, though its importance has perhaps been underestimated, a decided chemical alteration in the menstrual blood—it does not clot like ordinary blood, and he maintains that the uterine epithelium acts here like the kidney-glomerule, and that fibrin passing the one is analogous to albumin passing the other. Charrin³ has shown that the blood is at its maximum of toxicity at the menstrual period, and that disordered menstruation has its effect upon other secretions, infants at the breast being affected by such condi-

¹ Lancet, Apr. 16, 1898.

² Arch. de Physiol., July, 1897.

³ Gaz. hebdom. de Méd. et de Chir., Jan. 3, 1896.

tions in their nurses. The menstrual process, Keiffer holds, acts in two ways: Preparing for the maturation of germinative elements and exciting genetic activity on the one hand, and on the other eliminating from the organism certain products of secretion that, failing their direct biochemical application in reproduction, must be rapidly discharged. If this elimination fails, if these products are not utilized or gotten rid of, they acquire a toxic property, and their absorption gives rise to the disturbances of the nutrition and the derangement of systemic equilibrium that we observe as the effect of disordered or suppressed menstruation; the vascular, secretory, digestive, and psychic disturbances that are generally and rapidly relieved by the re-establishment of the function in its normal activity. Menstruation has been called a disappointed pregnancy, and from this point of view it is easy to see how the results of such will need to be gotten rid of in the normal economy of the organism. The uterus is in that sense certainly an excretory organ during the whole reproductive life, and the disturbances of the menopause are the results of an autointoxication from products to which the system only gradually becomes more accustomed and tolerant, until finally, with the suppression of the genetic function, they cease to be produced. The influence of the ovarian internal secretion cannot well be invoked to account for autointoxication-symptoms, such as many of those of the menopause and those accompanying menstrual suppression and disorder seem to be. Chlorosis, with which menstrual disorders generally seem to be associated, often in a causal way, may also possibly be properly considered as, in part at least, a symptom of uterine autointoxication, according to this theory of the uterus as an excreting glandular organ, and certain anemic disorders following parturition may possibly also fall into the same category. [It has heretofore been the custom to attribute all or many of these disturbances in the economy to a reflex influence from the genital organs, an easy but not very definite method of explanation. If we adopt the theory here proposed, that throughout the sexual life of women there is a constant contribution, it may be from all parts of the organism, of material destined for reproductive purposes, which, failing its normal function, must be thrown off through the process of menstruation, and which if retained causes promptly the symptoms of intoxication of the system, we have at least advanced a step beyond the mysterious and ill-defined "reflex influence" that has hitherto been invoked. The theory certainly has some merits and some facts apparently to support it, and it is, at all events, one that is suggestive and worthy of some consideration.]

The Biologic Basis of Menstruation.—[But little is known concerning the phenomena of sexual physiology, as the literature of the subject is very scant. Up to 10 or 15 years ago the universally accepted belief was that ovulation was the cause of menstruation; but a revolution in these views has taken place.] Webster¹ reviews the subject very thoroughly. He states that de Sinéty, in 1881, cast doubt on the old theory, and since that time many have agreed with him, although now there is by no means unanimity of opinion among students on the subject. Various theories as to the causation of menstruation have been introduced, but as yet no definite conclusions have been reached. To Johnstone in America and to Heape in England much of the credit is due of demonstrating that ovulation is not the cause of menstruation. In this connection Heape examined the pelvis of 42 monkeys (*Semnopithecus entellus*) during their menstrual periods, and found evidences of ovulation being in progress in only 2 cases. According to Lawson Tait, removal of the Fallopian tubes, the ovaries being left *in situ*, is followed in 95% of cases by

¹ Med. Rec., July 10, 1897.

cessation of menstruation. J. Bland Sutton says, in direct contradiction of this statement, that "the Fallopian tubes exercise no influence on menstruation, and in order to produce artificial amenorrhea both ovaries must be completely removed." In 1887 Johnstone disproved the long-held idea that each menstruation results in a shedding of the entire endometrium, and defines the process of menstruation as a shedding of the superficial layers of the endometrium, and as a kindred process to the moult in birds and the shedding of the horns and hair in the deer tribe. He has also advanced the theory, in which he is supported by Tait, that the menstrual act is a special function related to a distinct nervous mechanism. They think that possibly a special nerve-trunk running in the upper part of the broad ligament may convey the regulating currents. Webster is inclined to regard the subject from a body-metabolism and biologic point of view, and thinks that the theory advanced by Geddes and Thomson in their *Evolution of Sex* is worthy of great consideration. This theory holds that the menstrual process is related to the balancing of anabolism and katabolism in the female. If the female sex be preponderantly anabolic, menstruation is one of the functions of anabolism in the female, and is a means of getting rid of the anabolic surplus. Looked at from a biologic standpoint, the argument is as follows: Throughout the animal kingdom the distinctive and predominant characteristic of the male sex is katabolism, and of the female anabolism. The same distinction is also found in the plant-world, and these lines of inquiry are suggested thereby: 1. A study of sexual characteristics in the fully developed state and in the history of the individual. 2. An investigation into the condition of the lowest forms of animal life and plant-life in which sex has its beginning. 3. Observation of normal and pathologic changes in the reproductive apparatus. 4. Experimental inquiry into the nature of the factors which determine sex. [Doubtless there is much opportunity for original research in studying this question from a biologic standpoint, and it is possible that here the solution of the difficult problem will be found.]

C. J. Bond¹ calls attention to the occurrence in some cases of a menstrual secretion in the Fallopian tubes. In 4 cases in which healthy tubes were removed and examined on the first, third, fourth, and fifth days, respectively, of the menstrual flow, the contents were blood-stained mucus; while in healthy tubes removed in the intermenstrual period the contents were either clear or slightly opaque mucus from the admixture of epithelial cells. The secretion itself was, in the former cases, apparently identical with menstrual fluid. To the naked eye it was a viscid, purple-colored fluid, like a mixture of mucus and venous blood. Under the microscope it consisted of red blood-corpuscles and a variable quantity of leukocytes, and some epithelial cells in various stages of mucoid degeneration. The tubal mucosa was altered also. The fringe-like processes of membrane which cover the rugæ or villi were swollen and thickened in their transverse diameter, and were infiltrated with leukocytes, which could be traced passing in from the muscular and submucous coats, up the villi, and between and among the ciliated epithelial cells. The latter showed signs of mucoid degeneration. On the other hand, in the intermenstrual period the leukocytes are few in number, the villi are shrunken and consist only of an epithelial covering on the fibrovascular pedicle, and no red blood-corpuscles are found free in the lumen of the tubes. Thus, increased blood-supply, turgid vessels, and a marked leukocytic infiltration, with escape of red and white blood-corpuscles, are the chief characteristics of the changes in the tubal mucosa at the uterine third of the tube during menstruation. The

¹ Brit. Med. Jour., June 4, 1898.

secretion appears early in the tubes, coinciding with or even preceding the appearance of the flow externally.

Effect of the Erect Position on Menstruation.—E. C. Gehring¹ considers that the immense number and variety of diseases to which the human female is subject, in comparison to the female of other mammalia, is influenced by the erect position. The study of sanguineous menstruation, which belongs almost exclusively to the human female, has been the subject of much labor and speculation. Some scientists contend that it is a secretion; others that it is a hemorrhage. The author places himself unreservedly upon the latter side. If it is a hemorrhage, it is pathologic, and not physiologic. He considers this excessive sanguineous discharge an accidental hemorrhage, subserving no useful purpose, and recognizes for its principal cause the *erect position*. From his observations the author draws the following conclusions: 1. That the erect position of man is acquired or assumed, and that the different organs have to depend for their support greatly on accident and the gradual adaptation through necessity of means to ends. A gradual transformation has occurred through numberless years, but the transformation is not yet complete. 2. That if the support of the pelvic organs is insufficient for all purposes, then the production of artificial ligaments (Alexander's operation, ventrofixation, etc.) or artificial mechanical supports are the legitimate means to counteract the otherwise deficient conditions, and that a reliance on therapeutic agents is generally useless. 3. That menstruation is the equivalent of the rut or estruation of the lower animals, and may or may not be accompanied by a greater or less sanguineous discharge. 4. That any excessive loss of blood or for too long a period is radically wrong; a pathologic condition, due principally to the erect position; and that it should, by all means at our disposal, be repressed (not suppressed)—*i. e.*, diminished to a moderate quantity and duration—especially by mechanical means, as dry or wet vaginal tampons.

Sterility.—A. Routh² has made a comprehensive study of sterility. He gives the following classification of the causes of sterility: I. *Absolute*—*i. e.*, where there is no evidence of conception. (a) Congenital, due to congenital conditions which have always existed. (b) Acquired: 1. Primary, due to inflammation or other causes present at marriage, entirely preventing conception; 2. Secondary, coming on after the birth of a living child at the same or a previous marriage. II. *Nonabsolute*—*i. e.*, conception takes place, yet a viable child cannot be obtained, owing to fetal death and abortion, etc. This is usually due to noncongenital causes—acquired—and may be either primary, no fetus reaching a viable age, or secondary, due to recurring abortion from subinvolution, etc., after a viable birth. He also mentions some of the commoner causes of sterility in the male, constituting (Kehler) probably 25% (Gervis, 7% to 15%) of all the causes of sterility, as follows: (1) *Constitutional*—Syphilis; Bright's disease, especially the granular kidney; diabetes; and lead-poisoning. All these act by causing the spermatozoa to lack vitality, rendering them unable therefore to perform their essential spontaneous movements satisfactorily. These causes lead more particularly to an early death *in utero* (nonabsolute sterility), but may induce a condition of *absolute* sterility. (2) *Local Causes*—Absence of testes. Both testes undescended (cryptorchis). Double obstructive epididymitis (gonorrheal especially). Double tuberculous epididymitis. Stricture of the urethra. Nonvitality, or absence of spermatozoa, as discovered by the microscope. Impotence, which means incapacity for copulation, as opposed to sterility, which means incapacity for procreation.

¹ Denver Med. Times, Jan., 1898.

² Treatment, July 8, 1897.

Although impotence is often a cause of sterility, it is not necessarily so, for conception may take place without penetration.

According to Matthews Duncan, 1 in 10 marriages is sterile. He considered that the first birth usually occurs 12 to 15 months after marriage, but may be as late as 3 years. Fertility in women is greatest between 26 and 38 years of age. Sterility may be due to lack of penetration, as in absent or solid vagina, stenosis of the vagina, and imperforate or resistant hymen. Penetration may be normal, yet the spermatozoa may not be able to ascend beyond the upper end of the vagina, or, if they do ascend, no suitable nidus *in utero* is available. Among the causes relating to this group may be mentioned: Absent or solid or very undeveloped uterus (incurable). Immature uterus; this may tardily but sufficiently mature. The so-called sterile uterus, which is really a small uterus associated with ante flexion, a condition normal during infancy, with a conical and often elongated cervix, and round instead of transverse external os uteri. Cervical stenosis, congenital or acquired, with perhaps resulting hematometra (if complete); this might be curable by dilatation. Hyperinvolution. Postclimacteric atrophy. Destruction of the lining membrane by atrophic endometritis or by the use of escharotics, such as nitric acid. Fallopian tubes solid or absent (not capable of diagnosis). Tubal stenosis, or constriction of the tubes by external adhesions or closure of the peritoneal end of the tube by lymph. Tubes distended by serum, pus, or blood (hydrosalpinx, pyosalpinx, or hematosalpinx).

Again, it may result from conditions involving destruction or loss of vitality of the spermatozoon during the transit along the genital tract, as in gonorrhea of the vagina, endocervix, endometrium, or lining membrane of the Fallopian tubes. Fungous endometritis is a common cause of sterility, and is often a pure overgrowth of noninflammatory origin. *The passage from the vulva to the fimbriated extremity of the tube may be quite patent, and there may be no inflammation present, yet sterility is present. The reason may be in the function of ovulation.* Either the ovary is absent or contains no follicles; or it has become completely sclerosed and its follicles destroyed by inflammatory or malignant changes. If the ovaries were congenitally absent or functionless there would be moderate anemia, with absence of all menstrual menses, and there would almost certainly be absence of the signs of puberty. Occasionally double ovarian cysts may lead to complete destruction of the epioöphoric elements. Double ovariectomy, or removal of both appendages, would lead to the same result. One of the commonest causes, however, of faulty ovulation is a thickened capsule, the result of perioöphoritis. This prevents the escape of the matured ovum, and in turn leads to retention-cysts being formed, and secondarily to disorganization of the neighboring stroma and follicles. *Ovulation itself may be normal, yet the ovum is not received into the Fallopian tube.* This may be due to blocking of the tube near or at its fimbriated end, or to other tubal obstructive disease, such as hydrosalpinx or pyosalpinx; or the mischief may be due to an altered position of the ovary, especially if it is fixed at some distance from its tube. If there has been salpingitis the tubal cilia are destroyed, and the current from the peritoneum to the uterus is absent.

The Menopause.—At a recent meeting of the Paris Hospital Medical Society, Le Gendre¹ remarked that while the influence of the menopause on the circulation and on the nervous system was well understood, but little attention had been paid to its effect on the renal function. He had observed several cases which led him to the conclusion that the change of life

¹ Gaz. hebdom. de Méd. et de Chir., Dec. 16, 1897.

sometimes disordered the secretion of urine, perhaps by provoking renal congestion and diminishing the amount of urine, thus depriving the organism of one of its emunctories and leading to the retention of noxious substances that were normally carried off in the menstrual blood. A certain degree of self-intoxication might result from their retention. This was most apt to occur in women of a pronounced neuroarthritic habit. The symptoms mentioned by Le Gendre were a reduction of the amount of urine, sometimes moderate albuminuria or transitory hematuria, often lumbar pains, nausea, vomiting, and intense headache. They could be prevented, ameliorated, or altogether overcome by wet-cupping or leeching the region of the kidneys, leeching the cervix uteri, or general blood-letting, together with the use of diuretics, such as milk and theobromin.

The Menopause and Senile Involution of the Uterus.—Parviainen¹ has issued a very complete monograph on senile degeneration of the uterus. Many of the histologic changes are clearly morbid, and not always can disease be distinguished from natural atrophy. It is important to those who would lay stress on the microscope as a clinical agent to remember that Parviainen finds that while the cilia of the uterine and cervical epithelium grow scanty in sickly women near the menopause, they sometimes remain perfect in women over 60 in whom the uterine muscular tissue has undergone degenerative changes perceptible to the naked eye. This involution of the muscle is not easy to explain, even after careful research; and Parviainen finds no evidence whatever that changes in the blood-vessels play the first or most prominent part in bringing on active atrophy. Great care has been taken to distinguish between old women dead from general complaints, like typhoid fever, and those dead from local maladies least likely to affect the genito-urinary tract. Menopause-histories have been carefully collected from 250 cases. Of early menopauses Parviainen found 2 in women aged 37, 2 where the age was 38, 3 at 39, 12 at 40, 3 at 41, 11 at 42, 6 at 43, and 8 at 44. Then follow high numbers, as might be expected, falling rapidly after 51. The change of life came on in 3 patients at 54, and in the same number at 55, and in 1 at 56, and the same number in patients of the age of 57, 58, and 59, respectively.

[**Organotherapy** in gynecology has seemed to find its special field in the treatment of the climacteric manifestations.] E. Saalfeld,² in view of the observations of Landau on the oöphorin-treatment of nervous symptoms occurring in women about the climacteric period, gave oöphorin-preparations to women suffering from acne rosacea and cutaneous disorders at the menopause, with satisfactory results. Jacobs³ finds in regard to ovarian extract that by its use the disagreeable symptoms of the natural or artificial menopause are relieved or disappear. Rapid improvement is constant in cases of chlorosis and of dysmenorrhœa. The extract undeniably influences the psychic troubles accompanying genital lesions. It rapidly overcomes the metrorrhagia of the menopause not connected with new growths. It causes a rapid and constant improvement in the patient's general condition, and its therapeutic action upon the nervous system is manifest from the first day. The results of the treatment are usually apparent on the second or third day. He prefers a preparation in wine, the daily dosage being 5 drams, containing 3 gr. of ovarian extract. His results are as follows: 1. Climacteric disturbances (including vesical irritation) are either relieved or cease entirely, whether physiologic or following castration. 2. The results are most prompt in

¹ Mittheil. a. d. gynäk. Klinik der Prof. Engstein, vol. i., Part II., 1897.

² Berlin. klin. Woch., No. 13, 1898.

³ Dublin Jour. Med. Sci., Sept. 1, 1897.

patients suffering from chlorosis and dysmenorrhea. 3. The influence of the extract upon reflex psychic disturbances attending pelvic affections is marked. 4. In all cases a rapid and permanent improvement in the patient's general condition is noted, digestive troubles disappearing and the appetite being improved. 5. Climacteric hemorrhages resulting from neoplasms quickly cease. 6. The therapeutic action of the remedy upon the general nervous system is early observed. Federoff¹ injected extracts of menstrual blood, of the mammary glands, and of the ovaries into the blood of rabbits, with the view of noting their influence upon the blood-pressure. His conclusions are as follows: 1. An aqueous solution of the glycerin-extract of menstrual blood lowers the pressure in the carotid, increases the heart-action, and accelerates the respirations; the same effect is produced by a similar extract of blood obtained just before menstruation, by an extract made from the endometrium during ectopic gestation, and by an extract of the mammary gland. 2. Ovarin and fresh ovarian extract also raise the pressure, but diminish the heart-action and slow the respiration. 3. In the human female the pressure in the radial artery is notably increased after the administration of ovarin. 4. Poehl's ovarin has a marked beneficial effect in the disturbances attending the climacteric, as well as in functional derangements of the ovaries. Jouin² has employed the thyroid treatment in congestive states of the pelvic organs and for the cure of fibrous tumors of the uterus. He has found its effect particularly favorable in cases of hemorrhage. In cases of purely functional hemorrhage the results were a complete and lasting cure; also in those of hemorrhage at the menopause or dependent on flexions and versions. The growth of fibrous tumors was always checked by it, it often led to their retrogression, and when it was employed early it cured them. Kleinwächter³ notes similar results. He points out the poisonous action of thyroïdin on the heart, and the secondary symptoms (emaciation, irregularity of the heart's action, glycosuria, albuminuria, etc.), and warns against the injudicious employment of so dangerous a remedy. W. M. Polk,⁴ after mentioning the beneficial effect of thyroid extract on the metrorrhagia of fibroid tumors of the uterus, states that in several cases he has observed not only a checking of the tumors' growth, but even a decided retrocession with amelioration of the local symptoms and improvement in the general health.

Amenorrhea and Chlorosis.—A. R. Simpson⁵ states that the term amenorrhea includes a wide group of cases ranging, on the one hand, from those in which there is a simple diminution in the amount of flow, so that the patient, instead of menstruating for the usual period of 4 or 5 days, menstruates only for 3 or 4, or even 2; or where the patient who has been in the habit of losing 5 or 6 oz. of fluid, begins to lose only 2 to 4 oz.; to those cases, on the other hand, in which the discharge disappears entirely. There are cases in which sometimes the red discharge is replaced by a white mucous discharge—*menstrual leukorrhœa*, and there are cases in which there is no hint in the system that there is any tidal wave passing through it at the usual season. Further, the term amenorrhea is applied not only to the cases in which the discharge has appeared and then has more or less completely disappeared, but also to cases in which menstruation still goes on, but fails to escape externally. The amenorrhea may result from disease of the ovaries or cystic degeneration, or atrophy the result of inflammatory action. It is not probable that it ever results from disease of the tubes, but anomalies and diseases of the uterus may

¹ Vratoh, No. 26, 1897.

² Zeit. f. Geb. u. Gynäk, Band xxxvii., Heft 3, 1898.

³ Practitioner, Aug., 1898.

⁴ La Gynéc., Oct., 1897.

⁵ Med. News, July 3, 1897.

be responsible. In the treatment of the condition iron stands foremost, either alone or in combination with other drugs, as zinc, arsenic, manganese, aloes, myrrh, guaiacum, apiol, oxalic acid, and plants of the *Senecio* family.

Fothergill¹ has employed *Senecio* in pregnancy, in amenorrhea without pregnancy, in persons menstruating regularly, and in dysmenorrhea. He claims that it will not cause abortion or in any way influence the course of pregnancy. In cases of amenorrhea not due to anemia it acted very well. In the presence of anemia, however, and in other conditions of exhaustion due to disease, he has found *Senecio* quite inactive in restoring menstruation. In healthy individuals the drug hastens the flow, but does not increase the quantity. It does not act well in dysmenorrhea.

[The question of **bicycling for women** is still claiming considerable attention.] Fauquez² concludes that bicycle-riding may be recommended in cases in which there is absolute integrity of the genital organs, for anemic and chloroanemic persons, for dyspeptics, for neurasthenics, for sterile and obese persons, for young girls in whom menstruation is not normally established, and for women who have suffered from troubles dependent upon the menopause. In cases of diseases of the uterus or the ovary this exercise may be advised as follows: 1. In uterine congestion. 2. In amenorrhea or suppression of menstruation connected with arrest of development of the ovaries and of the uterus, with anemia, chloroanemia, digestive troubles, neurasthenia, and chronic affections; with troubles resulting from physical or mental shock, cold, etc. 3. In dysmenorrhea connected with nervous troubles. 4. In congestive dysmenorrhea due to any cause capable of provoking congestion in the uterus and the ovary, such as physical or mental shock. 5. In deviation of the menses or supplementary menstruation. 6. In fibrous tumors when the hemorrhagic stage has passed. Bicycle-riding may be permitted in cases of mechanical dysmenorrhea due to obstruction to the discharge of blood, either congenital or acquired, and in membranous dysmenorrhea; in cases in which the uterus becomes displaced; in cases of chronic metritis connected with arrest of involution of the uterus after confinement or abortion, if it is not painful and recovery has begun. In this case, however, the exercise must be taken in moderation; in cases of leukorrhea, in anemic and chloroanemic persons, and in cases in which the general condition is weak. Bicycle-riding must be absolutely proscribed as follows: 1. In amenorrhea connected with pulmonary phthisis, cancerous affections, diabetes, organic diseases of the heart, and diseases of the kidneys, such as albuminuria. 2. In cases of metrorrhagia or excessive menstruation. 3. In cases of inflammation of the uterus and its adnexa, acute metritis, chronic painful metritis, hemorrhagic endometritis, purulent endometritis, leukorrhea connected with an inflammatory condition of the intrauterine mucous membrane, inflammation of the adnexa, salpingitis, oöphoritis, salpingooöphoritis, perimetritis, pelvic cellulitis, and pelvic abscesses. 4. In cases of pelvic hematocoele and of fibrous tumors during the hemorrhagic stage. 5. In cases of inflammation of the vulva or vagina.

Müller³ has carefully investigated the urine of 12 persons after severe muscular exertion in bicycle-riding, with the following results: In the urine of 8 of 11 examined, or 72%, he found albumin, and in 8 of 12, or 66%, a considerable number of all forms of casts, in 6 of which the casts were as numerous as in acute and chronic forms of parenchymatous nephritis. In 2, or 16%, he found a few true hyaline casts with albumin, and in another there were kidney-epithelium and casts of every variety, but no albumin.

¹ N. Y. Med. Jour., Oct. 23, 1897.

² Jour. des Connaissances méd., Aug. 26, 1897.

³ Münch. med. Woch., No. 48, 1896.

Only 2 urines, or 16%, were constantly normal. The investigations confirm those of Stablewski and Leube, that muscular exertion can cause albuminuria. It is therefore a physiologic or functional albuminuria of short duration. It differs from other forms of physiologic albuminuria in which few or no casts are found. The casts here, however, were only found with the centrifuge, after forced riding, racing, and excessive muscular exertion. That frequently repeated overexertion in bicycling might develop chronic irritation—perhaps true chronic nephritis—appears from the observation of 2 other cases improbable.

Floel¹ says that bicycling exerts a favorable influence in all cases in which the uterine disorders are due to a relaxed condition of the parts. In chronic inflammatory conditions it may be indulged in with care and moderation, but must be interdicted in all acute cases. Great benefit is derived from cycling in lack of appetite, chronic constipation, sleeplessness, and general malaise—in fact, in all disorders due to insufficient exercise. The patients should not feel discouraged if improvement is not rapid or is even preceded by an aggravation of symptoms. It has a valuable influence in disordered menstruation, especially in amenorrhea and dysmenorrhea. Anemic, badly-nourished women gain in weight; while those who have a superabundance of fat are apt to lose. It is the physician's duty to draw attention to proper dressing before permitting active exercise. A corset should not be worn, as it interferes with respiration.

Menorrhagia and Metrorrhagia.—Dalcé² finds that menorrhagia is a frequent and almost necessary complication of the earlier stages of certain forms of valvular disease. When asystolism and cardiac cachexia set in, this symptom, as might be expected, is replaced by amenorrhea. On the other hand, menorrhagia not rarely precedes the physical signs of heart-disease; then it continues after they become evident, as long as the compensatory changes in the heart remain available. When breathlessness, vertigo, slight irregular action of the heart, and malleolar edema appear, the menorrhagia is at its height. This variety of uterine disease is especially common in mitral contraction, less frequent in mitral insufficiency, rare in aortic disease, and rarer in valvular disease of the right heart. In congenital cardiac disease it practically does not exist. Metrorrhagia is rare in diseases of the aortic valve, but occurs in mitral disease, particularly in cases of stenosis. It is seldom produced by affections of the right heart, and almost never by congenital malformations.

Connery³ speaks of the importance of an exact knowledge of the cause of metrorrhagia before treatment is attempted. He calls attention to the fact that cardiac, hepatic, or renal diseases have frequently produced metrorrhagia, although uterine disorder has been absent or slight. In such cases diaphoretic remedies should be given, according to the condition of the patient. Reliable remedies for checking hemorrhage are few. *Hydrastis Canadensis* is of value in many cases, and is too little known. Quinin and strychnin administered alone or in combination will often arrest hemorrhage in cases associated with debility. Absolute rest in a horizontal position and vaginal douches, with the water at a temperature of 110° to 115° F., will often suffice to control hemorrhage. If in spite of treatment the bleeding continues without assignable cause, the cavity of the uterus should be explored; for a bleeding polyp or submucous fibroid has been known to produce death by loss of blood, although in itself it may be a comparatively trivial affair.

¹ *Dentsch. med. Woch.*, No. 48, 1897.

² *Rev. méd.*, June 30, 1897.

³ *Intercollegiate Med. Jour.*, Dec., 1897.

Dysmenorrhea.—M. de Leon¹ combats the obstruction-theory of dysmenorrhea. He would divide dysmenorrhea into 2 classes—namely, dysmenorrheal endometritis and uterine spasm (essential dysmenorrhea). The first class would include all forms in which there was any local mechanical obstacle recognizable, such as a sharp turn in the uterine canal, with secondary proliferation of the mucous membrane, stenosis, and the typical dysmenorrheal endometritis. All other cases would fall under the head of uterine spasm. On the strength of Keiser's investigations he was inclined to regard this spasm as affecting the sphincter of the uterus—that is, the cervix. Out of 167 patients observed by the author during a certain length of time in the gynecologic department of a public clinic, 37 had complained of painful menstruation. In 32 of these a local cause was discovered, but in the 5 others, certainly virgins, the affection should be classed as spasmodic. Besides these 37 subjects of dysmenorrhea, there were among the patients 21 who had manifest stenosis without painful menstruation. Among the patients subjected to curetting were 17 who complained chiefly of dysmenorrhea, but only 1 of them had stenosis to a high degree. Of these 17, 8 were completely cured by curetting; of the 9 others, 7 returned in the course of a year with a relapse of their old trouble, and 2 received absolutely no relief. At their earnest request, one of these women was subjected to oöphorectomy, and the other to removal of the uterus. Treub remarked that stenosis might be due to swelling of the mucous membrane occurring only at the time of menstruation, and be undiagnostic at other times. If Keiser's investigations warranted the theory of spastic contraction, he thought high amputation of the cervix should be performed. Stratz called attention to the fact that diseases of the ovaries and of the Fallopian tubes might occasion dysmenorrhea. He mentioned a case of dysmenorrhea and sterility in which, after the failure of all the measures practised in Holland, Schröder's conical excision of the cervix had done away with both complaints. Van Tussenbroek stated that in the case of oöphorectomy reported by the author of the paper the microscope had revealed "subacute oöphoritis."

G. Bantock² recognizes only 3 rational methods of treatment—namely, division of the cervix, the stem-pessary, and dilatation by graduated bougies. J. Braithwaite³ says that the typical cases for dilatation are those in which the pain is confined to the first 2 days of the period.

Fliess⁴ calls attention to the fact that swelling and increased sensitiveness of the nasal mucosa, epistaxis, etc., are often noted during menstruation. Pathologic changes in this membrane may cause the "nasal" form of dysmenorrhea, which is temporarily relieved by cocainizing the nose, and permanently, or for a long period, by cauterizing the nasal mucosa. These "genital spots" in the nose (especially the tubercula septi) may become affected in scarlatina, diphtheria, or influenza, soon after puberty; the nasal congestion which appears every month at the time of menstruation may fail to be relieved by the monthly flow. The latter condition is also present during pregnancy. Every month the recurring nasal congestion will be observed, which fails to be relieved by the menstrual flow. The writer claims that the pain during the first stage of labor may be relieved by cocainizing the nose the same as in dysmenorrhea.

¹ *Centralbl. f. Gynäk.*, July 17, 1897.

³ *Ibid.*, July 31, 1897.

² *Lancet*, June 18, 1898.

⁴ *Centralbl. f. Gynäk.*, No. 4, 1897.

UTERINE INFLAMMATION.

Muscular Tissue of the Uterine Wall.—Fieux¹ has made a study of the normal disposition of the muscular fibers of the uterus. He lays special stress on the differentiation of the lower uterine segment from the rest of the organ, and endeavors to prove that the circular muscular fibers in the inner layer disappear almost entirely at the level of the upper border of the inferior uterine segment; also, that the longitudinal fibers of the middle and outer coats produce a distinct bundle passing over practically the entire length of the inferior segment. He considers that the annular ring is caused by the free termination of the circular muscular fibers. At the junction of the cervix and body a few circular muscular fibers are found, and form the internal os uteri. The external os uteri is composed of connective tissue enclosing numerous vessels, but containing no muscular fibers. An interesting addition to our knowledge of the existence of heterotopic fragments of tissue has been published by A. Nehr Korn.² Ever since the suggestion was made by Cohnheim that such displaced germs might account for the origin of the malignant tumors, the pathologic world has been on the lookout for evidence that would verify this hypothesis. Very few cases have been reported, and these have been instances of tumors and not of normal tissue. The case under consideration was that of a pregnant woman who had a large tumor of dense inflammatory tissue uniting the uterus with the promontory of the sacrum, following an infection in a previous pregnancy. It was impossible to deliver her *per vias naturales*, so Cesarean section was performed and the child removed. Death followed from intestinal obstruction. The uterus was found to be much hypertrophied on its posterior wall, where it had been adherent to the sacrum. Sections through this portion showed a very small bundle of striated muscular fibers, the entire thickness of the mass being only about $\frac{1}{200}$ in. In this minute fragment a number of stages of the development of muscle-fibers could be found, from long striated fibers with a sarcolemma and numerous nuclei, to a branched fiber with a single nucleus and only partial transverse or longitudinal striations.

Bacteriology of Chronic Endometritis.—J. P. Warbasse,³ who has recently made a careful study of the bacteriology of chronic endometritis, concludes that the healthy vagina has the power of destroying ordinary pathogenic bacteria, and when the organisms are introduced from without they perish in a few hours or days. An exception is the gonococcus of Neisser, which is capable of multiplying in the vaginal secretion; and certain other less common organisms, which do not enter into the etiology of ordinary chronic endometritis. From the study of a large number of sections of uteri, the seat of chronic endometritis, Warbasse is convinced that it is no more necessary to seek for a microbic origin in chronic endometritis than in chronic degeneration of any of the glandular organs. The glandular portion of the uterus is made up of secreting epithelial cells, resting upon a connective-tissue stroma, just as on the kidney, the liver, or the breast. Either of these elements may become changed or increased through irritative or trophic disturbances, without the presence of bacteria.

Senile Endometritis.—Croom⁴ states that this condition is much more frequently met with in hospital than in private practice. It is known by different terms, as "fetid endometritis of old women," "postlimacteric endo-

¹ Jour. de Méd. de Bordeaux, May 9, 1897.

² Arch. f. path. Anat. u. Physiol. u. f. klin. Med., Jan., 1898.

³ Am. Jour. Med. Sci., Feb., 1898.

⁴ Brit. Med. Jour., Feb. 19, 1898.

metritis," "leukorrhea of old women," and "senile uterine catarrh." The last term seems best to describe the symptoms. The differential diagnosis from malignant disease is the great difficulty. Croon recognizes 3 forms of the disease: 1. Those associated with fetid discharge and no hemorrhage; 2. Those associated with leukorrhea and slight hemorrhage; 3. Those in which hemorrhage is the main, if not the only, symptom. There are in all cases vaginal irritation, general cachexia, sallow skin, and emaciation, occasional rigors and night-sweats; the latter symptoms are really due to a slow sepsis. As to treatment, rest is best when the condition is nonmalignant or doubtful, and with rest, hot douching, and the exhibition of arsenic, strophanthus, and Chian turpentine. In addition, curettage of the mucous membrane, with subsequent packing and draining, will be required.

Treatment of Endometritis.—Nitot¹ maintains that the correct prophylactic treatment of parenchymatous metritis and chronic salpingitis consists in the rapid cure of recent endometritis, which is the starting-point of those troublesome diseases. To ensure cure a remedy is needed which can penetrate to the deepest recesses of the mucosa, and even the tubes, without dangerous effects. Caustics and fluid preparations do not possess such properties. A gas is required, and it must be freely diffusible, antiseptic, and capable of acting on the epithelium so as to modify without destroying it ("anticatarrhal action"). Bromin-vapor has the necessary qualities; a saturated aqueous solution should therefore be placed in a bottle with a double tubing like an ether-spray or the chloroform-bottle in a Junker's inhaler. A hollow sound connected with one tube is passed into the uterus, whilst the solution is made to bubble by pressure on a ball connected with the second tube. Thus vapor is propelled into the uterus. Nitot claims the best results, and notes that the advantages of gaseous diffusion over intrauterine injections or other medication are self-evident.

Excellent results have been obtained by Lorain² in gynecologic practice from ichthyol-dressings. These were in the form of tampons of cotton impregnated with 5% to 10% glycerin-solution of ichthyol. Sometimes only 1 tampon was applied, sometimes 5 or 6 were placed in the vaginal cul-de-sac and on the neck of the uterus, and so close as to exercise some pressure on the pelvic organs, from which useful results always appear to have been had. The dressing was removed by the patient in about 48 hours, and renewed 2 or 3 times a week. During the intervals hot antiseptic injections were prescribed, to be made morning and evening. In certain cases ichthyol was also given internally in doses of 0.1 gm., in pill-form, before each meal. The results of the treatment are summed up by the writer as follows: 1. Ichthyol employed as vaginal dressings and as innervations on the abdominal walls exerts an analgesic action that is manifest at times even from the first dressing, and which is more marked the longer the applications are continued. That the glycerin bears little or no part in the effect is evident from the fact that in many cases where it was applied alone it was ineffectual, but alleviation was had as soon as the ichthyol was employed. 2. It exerts, besides, an antiphlogistic action, it being observed that in general, under the influence of ichthyol-dressings, repeated for a variable length of time, the inflammatory lesions of the adnexa, peritoneum, and pelvic cellular tissue exhibited a marked tendency to resolution. The adnexa diminished in volume and regained their mobility, at the same time becoming less sensitive to pressure. The pelvic exudations underwent resorption, and the vaginal culs-de-sac regained by degrees their normal flexibility. In recent cases of light or

¹ La Gynéc., Oct. 15, 1897.

² Jour. de Méd., Mar., 1897.

medium intensity, a cure was almost always had in from 3 to 4 months. In long-standing salpingoövaritis, complicated with sclerotic periadnexa, intra-vaginal compression, combined with massage, gave excellent results. 3. Among the patients observed, many were afflicted with inflammatory lesions of the neck of the uterus, and a few even exhibited symptoms of vaginitis, that were all greatly ameliorated by the application of ichthyol-dressings. 4. Administered per os, ichthyol stimulates the digestive functions by its tonic action on the stomach, relieves arterial tension, and thus favors resorption of the pelvic exudations.

Ilkewitsch,¹ of Moscow, has satisfied himself experimentally of the truth of Snegnireff's statement as to the efficiency of lactic acid as a destroyer of pathogenic microorganisms in the uterovaginal tract. A 3% solution injected into the vagina, he finds, overcomes the odor that may be present in cases of leukorrhea, changes the color of the discharge from green or yellow to white, and may be used without danger in ambulatory practice and in cases of salpingoöphoritis. In certain cases, he thinks, the intrauterine employment of a stronger solution may be substituted for the use of the curet.

Jung² contributes an interesting paper on the renewal of the endometrium after cauterization, based on microscopic studies of a uterus removed 4 months after thorough cauterization of its interior. The operation was performed for obstinate hemorrhage, which had not been controlled by curettement and application of zinc-chlorid paste. An entire cast of the uterine cavity had been passed. On examination of the endometrium it was found that renewal of the epithelial layer had begun, though only over a small region. The new mucosa was in the same hyperplastic condition as before the cauterization. This proves that the endometrium "is a tissue possessing an inexhaustible power of regeneration," no matter how thoroughly it may be destroyed. Microscopic investigations by Werth show that young connective tissue is renewed, within a few days after the traumatism, from similar tissue in the muscularis. The former is only temporary, being replaced as early as the tenth day by normal stroma. The glands redevelop from remnants of preexisting glands, the superficial epithelium from that lining the mouths of the newly formed glands. The growth of the new vessels keeps pace with that of the regenerated mucosa, being complete even on the fifth day. Bossi's conclusions were somewhat different. He removed the endometrium and a portion of the muscularis from the uteri of dogs, and found that regeneration was complete in 3 months. He observed that the glands developed from remains of old glands only at the border of the raw surface; in the center of the wound the glands were formed by ingrowth of the new surface-epithelium into the subjacent connective tissue. The writer finds the conditions in his own specimen similar to those caused by experimental traumatism in Bossi's cases; the results were different, since after the cauterization regeneration was only partial, and the mucosa was renewed in 6 weeks, as shown by a return of the hemorrhages. The writer concludes that the use of zinc chlorid, in paste or strong solutions, within the uterine cavity for the relief of hemorrhage is reprehensible. Although the destructive character of the escharotic is marked, it is uneven and cannot be controlled, while there is great danger of producing stenosis. The application should not be repeated within less than 2 weeks, in order that the raw surface may have time to heal. The use of a 50% solution, applied on cotton, is preferable to pencils or intrauterine injections.

Vaginal Douching.—Vaginal douching has become such a universal practice, both in the hands of the public and under the supervision of medical

¹ Centralbl. f. Gynäk., Oct. 30, 1897.

² Ibid., No. 18, 1897.

men and nurses, that it is well to understand more of its therapeutic action. In an editorial¹ the following occurs: Irrigations of water at 104° to 122° F. act by the heat, which increases the circulation of the pelvic viscera. At a temperature of from 104° to 112° F. they have a vaso-dilating action; while at a temperature of 112° to 122° F. they cause constriction of the vessels. The latter temperatures are indicated in certain forms of metritis, especially the *atrophic* type, when due to prolonged lactation or to early menopause in stout subjects. In these cases the hot vaginal douche will regulate the uterine functions and the menses. Hot irrigations are of considerable value in chronic metritis, with a hard uterus, due to venous stasis, and by their use the symptoms disappear, menstruation becomes more abundant, and the mucosa takes on its normal rose color. In metritis of puerperal subinvolution they cause retraction of the enlarged organ, as well as a mucous transformation of the bloody lochia. In the above-mentioned conditions it is often well to increase the effect of the irrigation by the addition of slightly irritating substances, such as sodium chlorid or carbonate, or, what is still better, a teaspoonful or two of the plain tincture of iodin to every quart of water. Under no circumstances should we use antiseptic substances, properly speaking, because they cause changes to occur in the epithelium and bring about absorption by the mucosa, whose power of absorbing is greatly increased by heat. Injections at 112° to 122° F. act remarkably well in cases of chronic periuterine inflammation, as well as in periuterine and parametrical exudations. Combined with rest, these exudations may become absorbed, and many cases are cured that at first may have appeared to be only suitable for surgical interference. In such conditions the irrigations must be used in large quantities, at least 2 quarts, morning and night. If the patient is not sick enough to be confined to bed, she should be instructed to remain on a sofa for 2 hours after each injection. It sometimes happens that the irrigation will make the pain worse, a fact which indicates that there is a recent, nonencapsulated pelvic exudation, often containing very virulent bacteria, and if this is present the irrigations must be immediately stopped for a certain lapse of time. The same applies when the pain increases in cases of pelvic abscess, of parametrical or periuterine origin, with an acute or febrile evolution.

O. B. Will² says that the best positions for the douche are the exaggerated lateral and knee-elbow, the former being applicable with the aid of a Kelly pad, the latter in an ordinary bath-tub. The abdominal pressure is removed, the pelvic organs elevated, and the penetrability and efficiency of the heat in emptying the local circulatory system enhanced manifold. After such a vaginal irrigation given in a small stream, and as hot as can be borne for half an hour, the patient should be asked to maintain the recumbent posture for several hours. He deprecates the use of the hot vaginal morning douche and then allowing the patient to be on her feet the remainder of the day. The relaxing effect of the application temporarily softens and weakens the tissues and supports and causes them to lose their resiliency for some hours, during which, if the erect position is indulged in, the pelvic organs settle down, and when the vessels fill again their position is more cramped than before and their tortuosity increased. On the contrary, if the recumbent posture is maintained until reaction takes place, the normal elasticity of the vascular and other tissues is restored and a greater resistance offered to all morbid impulses.

The Use of Steam within the Uterine Cavity.—Vaporization.—Pitha³ reports the results of his observations in Pawlik's clinic, extending

¹ Ann. of Gyn. and Pediat., Sept., 1897.

² Canad. Pract., Oct., 1897.

³ Centralbl. f. Gynäk., No. 22, 1897.

over 2 years and including 46 patients. The deductions are also based on examinations of 6 uteri, removed from 4 to 14 days after the application of steam. The technic is quite simple: A small kettle, fitted with a thermometer, is connected with a double-current uterine catheter by means of rubber tubing; a wooden handle on the instrument protects the hand of the operator. The temperature is raised to 105° to 115° C., and after steam issues from the holes in the catheter the instrument is cooled to avoid burning the vagina, and is then introduced into the uterine cavity. The steam is then allowed to escape for one minute. It condenses within the uterine cavity, where its action is really due to the heat from the catheter and the hot water. Narcosis is not necessary, as most of the patients bear the application easily. Active uterine contractions followed, and in some cases were quite violent, attended with reflex vomiting, but there were no other unpleasant consequences. Sloughing occurred, and was not completed before the fourteenth day, the endometrium not being entirely regenerated until 4 weeks had elapsed, showing that the cauterizing effect was quite as profound as after the use of the Paquelin. Twenty-eight patients with hemorrhagic endometritis treated in this manner were discharged cured, and 10 with hemorrhage following abortion; in the latter, decidual remains were first removed with the curet before applying the steam. The use of this agent is also highly recommended in cases of malignant diseases of the corpus uteri. The advantages claimed for this method of intrauterine cauterization are the ease and rapidity with which it can be effected in a clinic, the immediate hemostatic effect, and the deep slough which is caused, as well as the freedom from untoward results. The after-treatment is simple. The patient is kept in bed until the slough has entirely separated, the vagina being irrigated and tamponed lightly with iodoform-gauze. No intrauterine injections are given. Among the disadvantages the writer mentions the unequal character of the cauterization and the fact that the after-treatment is more prolonged than after curettement. He is not willing to assert that "vaporization" is preferable to the latter operation.

Metritis.—B. Robinson¹ says that metritis is one of the most frequent diseases of women. About 10 women out of 15 who come to the clinics have a distinctly palpable metritis, which occurs in all grades, from the sensitive acute to the stage in which little sensation remains. It is produced by the gonococcus, streptococcus, and staphylococcus; and the modes of entrance are glandular, circulatory lesions, and the muscular tissue. In the treatment of metritis Lutaud² rejects the use of caustics and the curet, except for voluminous proliferations. After slow dilatation with 2 or 3 laminaria-tents of increasing sizes, requiring 3 to 6 days, and swabbing out the uterus with 1:10 iodoformed ether, he irrigates with a hot 3% solution of sodium carbonate, first the uterus and then the cervix, and swabs again. Then he introduces a compressed sponge, in severe cases dipped for 2 minutes in salicylic acid, 1; alcohol, 10; water, 240. He disinfects his sponges by soaking them in a solution of naphthol or sublimate at 1:1000 until they are fully expanded, when they are compressed and cut as usual and kept in a well-corked bottle filled with iodoform. The sponge can be left in the uterus for 6 to 8 hours; it produces no pain. As it expands it fills the uterine cavity completely, and squeezes the application into the remotest crevices. If indicated, he performs the Emmet operation.

¹ Jour. Am. Med. Assoc., Oct. 30 1897.

² Jour. de Méd. de Paris, Aug. 22, 1897.

UTERINE DISPLACEMENTS.

Toxic Materials Absorbed from the Bowels as a Cause of Version of the Uterus.—An interesting and suggestive paper is presented by J. Oliver¹ upon a new element in the production of uterine displacements. He states that in the upright position of the body under ordinary circumstances the axis of the uterus corresponds with that of the inlet of the pelvis: the fundus or upper pole is directed upward and forward, while the cervix or lower pole is directed downward and backward. This relationship of the poles to the pelvis and to each other should be maintained in spite even of those alterations in the line of action of gravitation which result when the individual assumes a more or less recumbent attitude. Except when the neighboring pelvic organs—the bladder and sigmoid—are unduly distended, no portion of the peritoneum covering the uterus should rest in contact with the serous lining of the pelvis. During the process of evolution the body of the uterus is thrust upward from the pelvic floor into a medium which affords it no appreciable support, but the organ is so peculiarly related to its peritoneal covering and the pelvic diaphragm—the broad ligaments included—that it is enabled to maintain its rigid and strained position. Between the muscular tissue of the uterus and the serous covering of this organ there exists a mutual tension. The peritoneal covering is, in fact, too small for the organ, and in virtue of the elastic pressure exerted by this membrane the underlying muscular tissue is perpetually more or less restrained and compressed. Deprived of its peritoneal coat, the uterus, as a whole, would become extended and more bulky. Under ordinary circumstances the muscular tissue reacts upon the membrane enveloping it and keeps it passively extended, and as long as these reciprocal tensions are preserved the uterus will maintain its erect position. In discussing the relationship of the uterus to its peritoneal covering, however, the existence of the broad ligaments and the structures included therein must not be ignored, for, taken as a whole, this septum of the pelvis may be likened to a leaf, and the uterus itself may be regarded as its mid-rib. In maintaining its erect position this mid-rib is aided very materially by the meso-hysteron tension, and it is evident that if this tension should from any cause become decidedly impaired, the mid-rib would assume a more or less recumbent position. With its natural connections the uterus is an elastic and rigid body, but severed from its broad ligaments it becomes a flexible structure. The cervix uteri as it passes through the vaginal vault is incorporated with the tissues which it invades; but the force of cohesion here is feeble, consequently the cervical or shorter arm of the lever is caused to move in the direction opposite that of the longer and more weighty corporeal arm when this is no longer able to resist the influence of gravitation. In the condition of version of the uterus the poles of the organ continue practically equidistant from each other; but they are correlatively deviated from the recognized normal situation, so that the axis of the uterus crosses that of the inlet of the pelvis. The displacement is designated anteversion, retroversion, right lateral version, or left lateral version, according as the fundus is directed more toward the anterior, the posterior, the right or the left wall of the pelvis. It varies greatly in amount, and we may observe every degree of deviation from that in which—at the seat of reflection of the peritoneum, where it passes from the uterus to the pelvic floor—there is a very limited and but slight contact of the serous surfaces to that in which the body of the uterus lies more or less passively on the upper surface of the pelvic diaphragm. In association with pregnancy

¹ Med. Age, Jan. 25, 1898.

and after parturition great molecular variations take place in the tissues of the uterus, and these changes are effected largely by the agency of water. In the unimpregnated state water is also a very important constituent of the uterine tissues, and its presence in due amount is necessary for the maintenance of those mutual tissue-tensions to which reference has been made. The tension exerted by the muscular tissue of the uterus in opposition to that maintained by the elasticity of the peritoneal covering of the organ is, in fact, mainly due to the water locked up in its meshes. The uterus, when removed from the body, rapidly becomes soft and flaccid, and this change is attributable to the loss of water by evaporation. In its vital state the water locked up in the meshes of the muscular tissue of this organ may become deficient in amount, and version may result in consequence of the harmonious relationship of the mutual tensions being thereby seriously disturbed. Sulphuretted hydrogen is occasionally produced in the bowel. It is a powerful protoplasmic poison, and by permeating the uterine tissues it may inhibit their actions. Plants exposed slightly and for a short time to the influence of this gas become more or less limp and tend to droop. A toxic material having an action like curare is commonly found in the gut, and this poison, when absorbed, may so affect the muscular tissue of the uterus as to cause it to lose its power of resisting filtration—a power which is so essential for the maintenance of turgescence.

A Belief that so-called Displacements of the Uterus are not Pathologic.—F. P. Hammond¹ believes that any position of the uterus is correct in which the organ is maintained at the proper level. Cases are not infrequently seen in which the uterus normally lies more or less posteriorly. Mackenrodt, after very careful anatomic studies, has stated that the pelvic fascia keeps *in situ* the pelvic viscera, and, while he lays perhaps too much stress upon the pelvic fascia in this connection, it is a factor which is not usually given sufficient attention. According to his own observation, Hammond cannot believe there is such a thing as uncomplicated displacement of the uterus—except prolapse—which deserves any attention. Skene said that flexions are not displacements, but pathologic conditions of the organ; and many writers claim that flexions are the result of an unequal growth or an arrested development in the uterine wall. Personally he could not accept this view, for it is almost the rule for the contour of the uterus in multiparæ to exhibit wide variations. Dysmenorrhea and sterility are attributed to obstruction or stenosis at the point of flexion—*i. e.*, at the internal os. If internal flexion is the cause of the stenosis, no relief would come except by straightening the flexion; yet it is well known that relief often follows divulsion of the os without other measures. According to some statistics quoted by Hart and Barbour, about half the cases of dysmenorrhea are associated with ante-flexion, yet, in another series referred to by the same authors, 46 out of 138 cases of dysmenorrhea did not exhibit any well-marked ante-flexion. Again, J. Reeves Jackson has stated that he has known of cases in which the obstruction was so acute as to prevent the introduction of the uterine sound; yet in these cases conception occurred shortly after marriage. It was not claimed that the dysmenorrhea and sterility are as frequent in retroflexion as in ante-flexion—indeed, those having retroversion are more than usually prolific, even when there is a profuse cervical catarrh. The most probable cause of retroversion is a short posterior vaginal wall acting in conjunction with the uterosacral and vesical ligaments. The retroflexion-pessary has been supposed to act by leverage; but, as a matter of fact, this instrument raises the organ into such a position that gravity causes it to fall forward. While admitting that

¹ Med. Rec., Apr. 30, 1898.

many factors are at work to throw the uterus backward, Hammond maintained that these conditions are all physiologic. Of 412 patients examined by him, full notes having been kept, 4 only were recorded as having displacement; in all these there was a varying degree of prolapse. In 10 cases only was the angle of flexion or version very marked, and in 1 the organ was situated decidedly posteriorly. The writer laid much stress on the erroneous deductions resulting from the unskilled use of the sound, a criticism which he asserted applied even to many otherwise experienced and skilful practitioners. Another source of error was the use of too large an instrument at first. Regarding stenosis and dysmenorrhea, it should be noted that fluid blood passed readily through the capillaries; hence it must be able to pass readily through the os, no matter how great the stenosis. No matter what the position of the uterus, if there was parametritis or perimetritis there would be symptoms. In his opinion, the use of strong antiseptics postpartum is a very prolific cause of parametritis.

Uterine Prolapse.—In speaking of the etiology of uterine prolapse, J. Oliver¹ points out that the vagina and broad ligaments are the structures immediately concerned in the production of prolapsus uteri. Water enters largely into the composition of the various soft tissues of bodies, and it is the presence of this compound in due proportion which determines to a greater or less extent the quality of firmness which is natural to each. It is therefore evident that if the amount of water which the tissues forming the vagina and broad ligaments should contain is greatly diminished, the tone of these structures will be impaired and they will thus be rendered less capable of withstanding the influence of gravitation. After the menopause, and as senility advances, a process of undue desiccation is apt to occur in the genital tract, as well as elsewhere, and although this may probably never be the sole agent determining prolapsus uteri, it will nevertheless be a powerful contributor. The rigidity of all tissues is to a greater or less extent dependent upon the presence of certain salts, and as lime enters largely into the composition of the tissues of the generative tract, it is impossible that any very decided diminution in the quantity of this ingredient can take place without the rigidity or resisting power of the impoverished structures being thereby impaired.

The vagina and broad ligaments are extremely elastic structures, and their utility is in a very high degree due to this property, which is attributable to the presence of a material called elastin. Should, however, the amount of this elastic substance, which is natural to these structures, be unduly diminished, their resisting power will be correlatively weakened, and gravitation will tend to drag down the uterus and adnexa until a state of equilibrium is established. In the majority of cases, prolapsus uteri is caused by the deficiency or absence of elastin in the vagina and broad ligaments. This condition of affairs may be occasioned by the elastic tissue having lost the power of manufacturing material like itself, or by the nutrient fluid failing to offer in sufficient amount the ingredients necessary for this process. If the former state exists, it may be impossible to restore the elastic property; but if the disorder has resulted from the deficiency or absence of the materials requisite for the maintenance of the integrity of the tissues, the physician may endeavor to supply these, and in this manner the tissues may be enabled again to combat effectually the influence of gravitation. Acting on the principles thus outlined, Oliver has used an impure preparation of elastin, obtained from the ligamentum nuchæ of the ox, with, he claims, remarkable success in uterine prolapse.

¹ Med. Press and Circ., May 19, 1897.

Retrodisplacements of the Uterus.—S. Pozzi¹ considers that retroversion and retroflexion of the uterus are not distinct morbid entities. They occur under 2 conditions: (1) Relaxation of the ligaments or flexibility of the cervix, without adhesions, with or without lesions of the appendages—that is, a movable retrodeviation; (2) posterior adhesions, especially around the appendages, after a perimetritis or perioöphorosalpingitis—that is, a fixed or adherent retrodeviation. Movable retrodeviation without lesions of the appendages might better be termed excessive mobility of a uterus which has lost its fixity. The principal phenomena of a nervous and reflex character which they cause are independent of the direction of the deviation and are due to the mobility. B. S. Schultze² gives the following etiology of posterior displacements of the uterus: (1) Relaxation of the uterine ligaments caused by pregnancy and puerperium; resorption proceeding from parametritis posterior; habitual constipation; continued recumbent position. (2) Fixation of the cervix anteriorly through spontaneous and artificial scars (parametritis anterior, lacerations of the cervix, discission of the cervix, fistula). (3) Abnormal shortness of the vagina, especially of the anterior wall (puerile arrest of development, senile atrophy). (4) Habitual fulness of the bladder. (5) Gaping vulva, the result of perineal lacerations; the everted anterior vaginal wall drags the cervix forward and the body is displaced backward. (6) Rarer causes are abnormal length of the cervix, tumors of the anterior uterine or cervical wall, incomplete descent of the ovaries, adhesions of the ovaries and tubes posteriorly.

According to A. Goldspohn,³ the pathologic features which accrue from retroversion, and more markedly from retroversionflexion, of the uterus may be arranged in 4 classes: 1. Mechanical obstruction or interference with the normal function of the adjacent hollow viscera, and mechanical embarrassments to gestation, which not infrequently induce abortion. The retroverted uterus turns over like a valve, and its fundus then occupies a part of the space that normally belongs to the rectum. Increased straining at stool is thereby invited, which often blocks the passage the more, and usually causes much discomfort or pain. Many such women avoid the attempt to pass a formed stool. Thus constipation and its well-known consequences are favored mechanically and by fear of the ordeal of defecation. The bladder is disturbed to a less degree by the displaced cervix, which either presses against it when the uterus is stiff and straight, or makes traction upon it when the uterus is markedly retroflexed. 2. Retroversion is the first stage of descensus uteri (prolapse). The position of the uterus and the play of forces with reference to it imply that the long diameter of the uterus and the long diameter of the vagina form with each other a variably acute angle, and that the vaginal lumen is closed by the pressure received upon its side. When, however, the uterus becomes retroverted its long diameter coincides approximately with that of the vagina, whose lumen is then not so firmly collapsed as before, and the uterus slips like a wedge down the vaginal tube, in response to the overpowering impulses of intraabdominal pressure wrongly applied. 3. Retroversion of the uterus induces disease in the ovaries, because it is both the most frequent and the most potent cause of descensus ovariorum. The short utero-ovarian ligament is the only firm fibromuscular support that the ovary has. The attachment at its hilum and the suspensory ligament of the ovary which holds it upward and outward are only membranous peritoneal folds, which yield not only when the ovary is drawn into the ventral or vaginal incision, and when the ovary ascends with the pregnant uterus into the abdomen, but

¹ Rev. de Gyn., May and June, 1897.

² Centralbl. f. Gynäk., No. 25, 1897.

³ N. Am. Pract., Dec., 1897.

also when the fundus uteri makes its incomplete somersault and clearly tears the ovary, by the unyielding, short uteroövarian ligament, away from its sheltered retreat up along the lateral wall of the pelvis beneath its brim and drags it downward and toward the median line, where it becomes helplessly subject to the dominant forces from above. It suffers there from 2 great evils: (a) Venous hyperemia due to traction and torsion on its supports, and (b) mechanical traumata from the ever-refilling rectum behind or near it, and from the body of the uterus, now crowded down upon it by intraabdominal pressure, or by being caught between the two. 4. Retroversion and retroversionoflexion of the uterus, by traction and torsion applied to the uterine and ovarian ligaments and upon the efferent vessels therein contained, induce a partial venous stasis in these organs and a proportionate reduction of the natural and considerable defensive capacity of normal tissues against microbic invasion. No one can rationally deny the potent physical cause for this, that is stated best by the highest authority, B. S. Schultze, "That, furthermore, the circulation of blood in the uterus must be materially altered by torsion of the broad ligaments in which the venous plexus lies, through which the return-current of blood from the uterus must take place. Ninety degrees, and not infrequently more, this torsion amounts to; 90 degrees and more do we untwist the broad ligaments when we restore the markedly retroflexed uterus to normal position." But, next to torsion, the traction that must occur in the broad ligaments incidentally with retroversion must not be overlooked, because this implies a decided descensus of the body of the uterus, and, to a less degree, of the entire organ. That tension of the broad-ligament web tends to collapse the lumina of veins that are suspended between its two layers is quite self-evident.

Operative Treatment of Retroflexion.—Jonnesco¹ describes the following method applicable to cases in which there is no accompanying disease of the adnexa. The abdomen is opened by a low median incision, the uterus freed from its adhesions and brought forward. A wedge-shaped piece of tissue is excised from the anterior uterine wall at a point opposite the angle of flexion, and the wound is closed with deep catgut sutures. The round ligaments are then shortened according to Wylie's method. The writer reports 4 successful operations. W. L. Burrage² advocates division of the uterosacral ligaments and suspensio uteri for immobile retroposition with ante-flexion. To divide the ligaments, a broad, flat spatula in the hands of the assistant—the patient being in the Trendelenburg posture—holds back the gauze-covered intestines; and the uterosacral ligaments, put on the stretch by the uterus, held well up by means of a carrying-thread passed through the anterior fundus, are brought into view. They are seen as 2 tense, white bands coming from the pelvic wall at the region of the second bone of the sacrum and meeting on the posterior aspect of the uterus in the form of a pointed arch with its apex at about the level of the internal os. Each ligament is cut with a knife, at the place where it leaves the uterus, by a small incision at right angles to the long axis of the ligament. The uterus, freed from behind, springs forward, and a lozenge-shaped raw surface is left where each ligament is divided. These may be covered with peritoneum by 2 or 3 transverse stitches of catgut. G. W. Spidler,³ after performing an abdominal section, incises the peritoneum horizontally just above where it is reflected from the bladder to the uterus, and denudes the anterior portion of the uterus as near to its vaginal attachment as possible. He then passes No. 6 or 8 chromicized

¹ La Gynéc., Oct., 1897.

² Boston M. and S. Jour., Dec. 23, 1897.

³ West. Med. Rev., July 15, 1897.

catgut through the anterior portion of the fundus from right to left or left to right, horizontally with the body of the uterus, but not entering the cavity of the organ. The thread should cross to the opposite side of the uterus, and then be made to pass back to the same side through the anterior portion of the cervix, just above the vaginal attachment. The thread is now to be tied with the one from the opposite side of the fundus. This leaves the thread passed through the cervix and fundus and crossed over the anterior portion of the body of the uterus. By drawing the thread tightly before tying it the uterus can be made either straight or, what is to be preferred, slightly ante-flexed, with the catgut acting in relation to the uterus as a bowstring to a bow. The incised peritoneal surface can now be approximated and the uterus fastened to the lower portion of the abdominal wound. The author claims that this allows of perfect mobility without fixation.

Vaginal Operations.—(a) *Vaginal Kolpotomy*.—T. H. Wilson¹ points out the facility with which the adnexa may be drawn down and examined, adhesions of the ovaries separated, and tubes and ovaries removed, or, if found healthy, replaced, through the vaginal incision. Small subperitoneal myomata, if pedunculated, may be ligated, or, if sessile, incised, removed, and the peritoneum closed over. Small ovarian and parovarian cystomata may likewise be easily treated, or, if too large, the contents may first be evacuated, the pedicle tied, and the cyst removed. He expressed disapproval of the operation of vaginal fixation for retroversion, except in cases past the child-bearing period, or for the control of hemorrhage impossible by other means. He dwells specially on the treatment of pyosalpinx by this method, and lays stress upon the usual site of rupture of the pus-sac when separating adhesions—namely, the posterior surface, which is the most unfavorable situation in operating by celiotomy, but favorable when by vaginal kolpotomy. He strongly advocated removal of the uterus in severe cases of pyosalpinx with dense adhesions of long standing. Having described the operation of posterior kolpotomy, he discussed the question of pelvic hemoatocoele and pelvic abscess, pointing out the great advantage this method presented for efficient drainage. Densely adherent ovaries deeply situated in Douglas's pouch he regarded as suitable for the posterior operation, but he deprecated treatment of ruptured tubal pregnancy by the vaginal method. Two difficulties in kolpotomy were emphasized—namely, rendering the vagina aseptic and reaching the peritoneum. He also drew attention to the ever-present danger of wounding the ureters. He compared the separation of adhesions by Schultze's method and vaginal kolpotomy with the danger of concealed hemorrhage in the former, and expressed his preference for the latter method, as being more under control. He insisted strongly that no one should undertake vaginal kolpotomy who was not prepared to open the abdomen if found necessary, as there are always present the danger of uncontrollable hemorrhage and the possibility of being unable to complete the operation from below. He then mentioned certain cases not suited to this operation, as large dermoid tumors; deformity of the pelvis, rendering the operation very difficult; large ovarian tumors, and advanced ectopic gestation. He claimed as advantages the absence of risk of ventral hernia, less shock, absence of the distressing thirst so common even after exploratory abdominal incision, and more speedy convalescence.

(b) *Vaginal Fixation*.—Vineberg² claims that his modification of Mackenrodt's operation is in reality a uterovaginal fixation, and not fixation of the

¹ Brit. Med. Jour., Feb. 26, 1898.

² Am. Jour. Obst., July, 1897.

round ligaments. J. C. Webb¹ states that the advantages of Mackenrodt's operation are: 1. That the longitudinal incision through the anterior vaginal wall does away with any risk of cutting the ureters or large vessels, and also that, in cases in which the vagina is large and lax, this longitudinal incision can be converted into a rhomboid one, and thus an anterior kolporrhaphy can be done at one and the same time as the vaginal fixation, thus strengthening the point of attachment of the uterus and curing any prolapse that may be present. 2. That by using absorbent catgut, instead of nonabsorbent silkworm gut, the uterus is eventually maintained in place purely by adhesions which, in the event of subsequent pregnancy, can stretch and allow the uterus to rise out of the pelvic cavity in a normal manner. 3. That by fixing the body, and not the fundus only, the final position of the organ is not one of such extreme ante flexion as in the Dührssen operation.

Alexander's Operation.—Anatomy of the Round Ligaments.—Beuttner² found from his studies in the cadaver that it was difficult to find the ligaments after they left the external ring. He advises that they be sought in the canal or at the internal ring. The average thickness of the ligament is 2.3 mm. There is considerable variation in the distance from Poupart's ligament at which they are found, as well as in the extent to which the cord can be drawn out ($1\frac{1}{2}$ to 4 in.). In one case the ligament was split up into separate fibers in the broad ligament. It was found that by fixing the shortened cords near the symphysis the uterus was anteverted further, while by attaching them near the anterior spine more elevation of the organ was obtained, hence the latter method is preferable. On distending the bladder the uterus is seen to be in normal ante flexion when thus suspended. If the ligaments are attached near the symphysis, diverticula of the bladder are formed when the organ is distended, which might readily give rise to disturbances in the living subject.

F. H. Martin³ says that the men who condemn this operation are those who have not done it frequently enough to understand it. No one should express his opinion until he had done at least 100 operations, when he could not condemn it. Hernia never results from it. The operation has but a small range of usefulness—namely, in retroversion without adhesions or surrounding inflammatory conditions. It should not be done in prolapse unless the support is restored by a simultaneous operation. J. R. Goffe⁴ states that the field of application has been extended to include cases of adherent uteri by introducing the preliminary steps of a vaginal section, breaking up the adhesions, and setting the uterus free. But when once the vagina has been incised and the pelvic cavity entered the opportunity is offered of shortening the round ligaments through the vaginal incision, and thus relieving the patient of the additional inguinal wounds, the danger of hernia, and the objectionable scars. Goffe has employed recently a method of shortening the round ligaments through a vaginal incision, which has given him thus far much satisfaction. H. F. Hayd⁵ emphasizes the importance of finding the spine of the pubes, because close to this spot the external opening of the canal exists. Then an incision 1 or $1\frac{1}{2}$ in. in length is made at an angle of 45 degrees to the spine of the pubes through the skin and fat. Then the fascia over the external oblique should be carefully dissected away so as to thoroughly expose the tendinous fibers of the muscle. The finger will now readily find the opening of the ring, covered as it is with the thin, intercolumnar fascia.

¹ Lancet, Aug. 28, 1897.

² N. Y. Polyclinic, Aug. 15, 1897.

³ Monats. f. Geb. u. Gynäk., Band v., Heft 3, 1897.

⁴ Med. News, Sept. 18, 1897.

⁵ Ann. of Gyn. and Pediat., June, 1898.

Suspension of the Uterus.—According to J. G. Lynds,¹ ventrofixation may be direct or indirect. In the direct method some part of the uterine body is brought against the wall for union; it may be the sides of the fundus (direct lateral fixation), or it may be the upper anterior or posterior part (direct median fixation). In the indirect method, as practised by Koeberle, Koltz, and others, some ligaments, either the ovarian or a part of the broad ligament and tube, or all together, are fixed in the incision. In the direct lateral method, as practised by Olshausen and Snger, two sets of sutures are used, one on either side of the fundus, and fastened to the wall on each side of the incision. Thus a double or a very broad union is obtained. If a double, there is an intervening space which offers an excellent opportunity for strangulation of the intestines. C. J. Bond² offers a new method of ventrofixation, or rather a modification of Alexander's operation. The abdomen is opened in the usual way. The round ligament on one side is then identified as it passes from the fundus to the pelvic brim; the ligament, with its investing fold of peritoneum constituting the free edge of the broad ligament, is pinched up between the finger and thumb at a point a finger's breadth distant from the uterus. The peritoneum is in this way made tight over the ligament. A small incision is made through the peritoneum just over the ligament, the loosely connected fibers of the ligament isolated, and the exposed portion freed and turned out of its investing membrane by means of the finger- and thumb-nails, blunt dissector, or hook. When well isolated it can be pulled upon and made tense peripherally, and when thus tightened it is divided with a snip of the scissors as it stands up covered with peritoneum near the brim of the pelvis, or at any spot which gives enough length of tendon to work with. This should not be less than 3 inches. Now, by sliding back the peritoneum with the finger and thumb of one hand, and at the same time making traction on the ligament in a peripheral direction with the other, the ligament can be pulled out of the peritoneum along its entire course up to the point at which it has been divided, like a finger out of a glove, leaving it, of course, still attached to the fundus. The same process is repeated on the other side. It is important in doing this to see that the whole thickness of the ligament is included and liberated in the first instance, in order to avoid drawing out a few only of the frayed-out fibers. It should come out as a whitish cord as thick as a No. 8 or No. 12 catheter, or in some cases larger. Sliding the skin on one side, he passes a pair of sinus-forceps through the whole thickness of the abdominal wall on one side of the incision, not, however, including the peritoneum. The end of the ligament is seized with the forceps and drawn through, and the same process repeated on the other side; the uterus is now steadied against the abdominal wall and the sides of the incision approximated. In some cases he has tied the two ligaments in a knot over the abdominal incision in front beneath the skin; in others he has stitched the ends together or stitched each one down, folded on itself, to the abdominal wall; the rest of the incision is closed in two or more layers and the skin sutured over it in the ordinary way. It is important to raise and fasten the fundus to the abdominal wall at a sufficiently high point above the pubes; in many cases the uterus is fastened too low down and the stretched vaginal walls are not pulled fully up.

¹ Physician and Surgeon, July, 1897.

² *Lancet*, Feb. 12, 1898.

FIBROID TUMOR OF THE UTERUS.

Frequency.—According to W. Anderson,¹ Klob maintains, after an extensive experience, that 40% of all women who die after the 50th year have uterine fibroids. Winckel, in 575 autopsies upon females, found only 12%. Of 135 women under 35 years of age examined by him, only 5% had fibroids. Fully 90% of these tumors develop in the body of the uterus, and 10% or less in the cervix. F. H. Martin estimates from personal observation the frequency of the different varieties as follows: Submucous, 10%; intramural, 15%; subperitoneal, 20%; interstitial (diffuse), 55%. According to J. Bland Sutton,² there is nothing in oncology better established than the fact that all uterine myomata arise during the menstrual period of life. In Great Britain menstrual life covers an average of 30 years, from the 15th to the 45th year. There is, however, no reliable record of a myoma being found in the uterus before the 20th year. Several examples have been observed between the 20th and 25th years. Between 25 and 30, myomata are fairly common; but the maximum frequency is attained between the 35th and 45th years. Matthews Duncan pointed out that the interval between the 25th and the 35th years of a woman's life may be regarded as the great child-bearing period, with an average length of 12 years. The menstrual epoch of a woman's life may be divided into 3 periods in relation to pregnancy and myomata, thus: 1. From 15 to 25, in which, assuming the environment to be favorable, a woman is infinitely more liable to conceive than to grow a myoma in the uterus. 2. From 25 to 35; during this period her liability to pregnancy is greater than in the preceding period, but her liability to myoma is also greater. 3. From 35 to 45; in this the liability to conception is greatly diminished, but that for myomata is immensely increased.

Etiology and Pathology.—[The etiologic factor responsible for the development of uterine growths is still a vexed question. The most plausible theory would seem to be that of irritation. Some irritant of the uterus or adnexa, such as endometritis or metritis, or some septic absorption, may be operative in their production. Byford suggests the possibility that the lodging of some microorganism in the uterine wall would explain the cause of this development.] According to W. Anderson,³ Senn maintains that uterine tumors cannot develop from mature tissue. Winckel inclines to the theory that they spring from the uterine interparietal blood-vessels. Klebs is of the opinion that they grow from the connective tissue of the blood-vessels. Velpeau considers that uterine fibroids develop from small blood-clots in the uterine walls. Pozzi has demonstrated experimentally that Velpeau's theory is untenable. Kleinwächter, according to Martin, ascribes the growth of uterine tumors to a round-cell formation found along the capillaries. Anderson is fully convinced that fibroid tumors are localized or diffuse hypertrophies or developments of embryonic (mesoblastic) uterine parenchymatous tissue. A. Aubean⁴ suggests the association of syphilis with the pathogeny of fibromata. He says that all investigations, whether clinical, anatomopathologic, histologic, or bacteriologic, agree in laying down a relation of cause and effect between the fertilization of the ovule of a healthy woman by a syphilitic subject, the lodging of this infected ovule at a spot in the uterine mucous membrane, and the development of an infectious neoplasm—at first inflammatory, then fibromyomatous, and then sclerotic (fibroma). He claims that the

¹ Pacific Med. Jour., Sept., 1897.² Clin. Jour., Feb. 23, 1898.³ Loc. cit.⁴ Ann. of Gyn. and Pediat., June, 1898.

specific treatment ought always to be employed persistently in cases of fibromyomata or fibromata of the uterus.

Symptomatology.—Anderson¹ gives among the first symptoms to be noted, irritability (reflex and hysteric manifestations); sanguis, chylous, or purulent leukorrhœal discharges; hypogastric enlargement; pain in the pelvic, ovarian, and sacral regions, often extending down the legs; dysmenorrhea, menorrhagia, and later on metrorrhagia. He has found disturbances of menstruation in fully 80% of patients suffering from uterine tumors, especially those having the submucous and interstitial varieties. Pressure-symptoms soon develop: (a) On the bladder: producing irritability, frequent micturition, dysuria, retention, cystitis. (b) On the ureters: causing hydronephrosis on one or both sides. (c) On the rectum: interfering with normal action, and producing constipation, obstruction, tenesmus, hemorrhoids. This interference with the lower bowel is responsible for grave results, as the excreta are allowed to remain for a considerable time, causing what is known as retention-toxicosis, from the absorption of stercoraceous toxins. (d) On the pelvic nerves: causing neuralgia or anesthesia down the thighs and in the sacral regions. (e) On the veins: producing edema and varicosities in the lower extremities, vulva, and rectum. Enlarged abdominal veins are due to pressure on the return-flow from the legs. M. Ozenne² calls attention to the frequent occurrence of uremia in uterine fibroma; and Bossi,³ in his valuable paper on the process of absorption of uterine fibroids, states that he detected marked and prolonged acetoneuria during the retrogression of fibroids after oöphorectomy or ligation of the ovarian arteries. Hartmann and Fredet⁴ also observed a distinct excess of acetone in the urine of their patients after ligation of the uterine arteries. They think it proper to note, however, that evidence as to the normal excretion of that compound and as to acetoneuria after anesthesia and in disease, remains defective. Chemical tests, too, are difficult in this case and require an expert, nor is the favorite test for acetone (Legal and Chautard's) reliable. Becker has found that acetoneuria is common, though not constant, after anesthesia by any of the usual compounds. Argensen detected $\frac{1}{2}$ gm. of acetone in a liter of urine ($7\frac{1}{2}$ gr. to $1\frac{3}{4}$ pint) after chloroform-narcosis. The same observer found a slight excess of acetone in the urine of a patient suffering from rectal cancer, and others have seen the same in cases of malignant tumors. In conclusion, marked acetoneuria is certainly seen where uterine fibroids are undergoing absorption, but the exact significance of the phenomenon has not been explained. Bossi and Hartmann do not assert that it represents direct molecular disintegration of the "fibroid."

The Ovaries in Fibromyoma of the Uterus.—Van Meerdervoort⁵ examined 45 specimens, reaching the following conclusions: The circulatory changes produced by myomata cause hyaline degeneration of the vessel-walls in the ovary. The stroma usually undergoes a similar degeneration. The number of primordial follicles diminishes and some of them degenerate. Follicular and corpus-luteum cysts develop. Corpora albicantia are very common, originating from hyaline degeneration of the thickened vessels. Pigmented cells are numerous. The writer was unable to demonstrate the presence of inflammatory processes. He finds that the usual enlargement of the ovary is due to the formation of corpora albicantia, as well as to the enlargement of follicles and cystic development.

Treatment of Uterine Fibroids.—*Palliative Treatment.*—With the

¹ Loc. cit.

² Sem. Gynéc., June 15, 1897.

³ Arch. di Ost. e Gin., vol. iv., p. 4, 1898.

⁴ Ann. de Gynéc. et d'Obstét., Apr., 1898.

⁵ Centralbl. f. Gynäk., No. 10, 1897.

object in view of carrying the patient on to the menopause, when with the atrophy of the pelvic organs also atrophy of nonmalignant tumors takes place, L. Remfry¹ recommends the following: 1. Exercise. This will develop the muscles, and the muscle-forming foods will go principally to them and not to a tumor, which may be taken to represent abnormal muscular formative energy. 2. Food. White meat (sparingly), fish, starchy foods, vegetables, and fresh fruits. Red meat is bad. 3. Purgatives. Magnesium sulphate and sodium sulphate are the best, for they deplete the pelvis by relieving the lower bowel thoroughly. 4. Rest. Rest during menstruation. 5. Drugs. In interstitial or submucous tumors the patient should be kept on ergot continuously, potassium bromid being a useful addition sometimes. Ergot can be taken in all weathers, and keeps well if to the mixture be added 5 drops of hydrobromic acid and 15 drops of spirits of chloroform. 6. Operation. If there be much bleeding the cervix should be dilated to see if there be a polypus. In cases of hemorrhage, leukorrhea, and dysmenorrhea the cavity should be thoroughly curetted and the walls subsequently painted with iodized phenol. 7. Watching. A regular and periodic examination of the tumor must be made, and strict injunctions given to the patient to report herself immediately should any change of symptoms occur.

[**Organothrapy** in the treatment of uterine fibroids is still in its infancy, although the reports of cases successfully, or at least satisfactorily, treated in this manner are accumulating. The enthusiasm of the investigators is always a factor to bear in mind, however, in such reports. As a rule, within a few days a marked amelioration is to be noted, and some observers claim a complete symptomatic cure and a marked diminution in size, if not a total obliteration, of the tumor. Increased heart-action and nausea are noted when large doses are given. Physiologic chemists have decided that the active principle is the iodine contained in the thyroid gland. This would seem to throw more weight on the probability of the specific origin of the growth.]

In a short paper Howitz² Copenhagen² considers the effect of lactation in producing involution of the uterus after parturition and its power in causing diminution or absorption of myomata when these are present. He describes 2 cases of large intramural myoma, both treated at the same time, and both complicated by pregnancy. Both patients were confined of living children, and both made a satisfactory recovery from the "lying-in." One of the patients suckled her child, and in 4 months her tumor had diminished in size. The other patient had but little milk and did not persevere with lactation; and in this case the myoma was unchanged. From the consideration of these and similar cases, from the consideration of the physiologic effect of suction of the nipple in producing contraction of the uterus, and of prolonged lactation in occasionally causing atrophy, the author has been induced to try artificial suckling or aspiration of the nipple in patients who are not pregnant, but who are suffering from myoma. Seven cases are reported: in 4 of these a secretion of milk was induced by the aspiration, 2 refused to respond to treatment, and in 1 the time had been too short for a definite report. In 3 of the cases the tumor had decidedly decreased in size; in 3 the measurements remained the same; in only 1 was there any marked decrease of hemorrhage. The aspiration in these cases had been limited to "from 5 to 10 minutes morning and evening," but the author's intention is that such aspiration should, if possible, imitate closely the process of natural suckling, and that accordingly the aspiration should occupy a longer time and be more frequently repeated.

¹ Internat. Clin., vol. iv., series vi., p. 35, 1897.

² Der Frauenarzt, Heft 4, Apr., 1897.

Surgical Treatment.—W. Anderson¹ states that the surgical measures at our command for the relief of uterine fibroids are curettement, splitting of the cervix, and ligation of the uterine arteries; ligation of the ovarian arteries; vaginal enucleation; morcelllement, or avulsion (vaginal). Abdominal myomectomy, salpingo-oophorectomy, vaginal hysterectomy, and abdominal hysterectomy.

Vaginal Ligation of the Uterine Arteries.—F. H. Martin² says that the results sought in this operation are, first, to check uterine hemorrhages by cutting off blood-channels; and, secondly, to produce atrophy of the fibroid by (1) depriving it of nourishment through the blood-vessels, and (2) by changing the nutrition of the uterus by interfering with its nerve-supply. Reckoned from the standpoint of mortality, this is a minor operation. Except in rare instances, where it would seem necessary to open the peritoneal cavity in order to reach the ovarian artery, the peritoneum is not opened. From a domestic standpoint the operation possesses advantages of importance. It does not unsex the woman. It is applicable in those desperate hemorrhagic cases in which the depletion is such that mere radical measures are positively prohibited. It provides a prompt means of depriving these bleeding tumors of two-thirds their blood-supply instantly, and with so little shock that the weakest patient need not hesitate to accept its benefits. The operation can be resorted to in cases of fibroids of the uterus in which complications are such that the mechanical difficulties in the way of a radical operation are so great as to increase materially the risk of such operations, or, in desperate cases, to make an operation entirely impossible. The operation, he thinks, should be given preference in all interstitial fibroids of a bleeding character which are discovered, because of their rapid growth and increased hemorrhage, just as the menopause is approaching. It may also be employed as a substitute in all cases of growing and bleeding fibroids where patients, from fear or prejudice, absolutely object to radical procedures; and he thinks it should become more of a routine practice in all bleeding or growing fibroids in which the tumor has not become a burden from its size and in which the tumor is sufficiently interstitial, so that it receives the bulk of its blood-supply from the portion of the uterus supplied by the uterine arteries. The operation is not applicable in cases of pedunculated tumors of the submucous or subperitoneal variety. Goelet³ restricts the operation to interstitial growths that have not extended beyond the level of the umbilicus, and to small subperitoneal growths which spring from the wall of the uterus below the fundus, and are without extensive adhesions through which the tumor may obtain nourishment. He has not seen a tumor completely disappear after the operation, but has uniformly seen a decrease in the size of the tumor and disappearance of the symptoms. He insists upon the necessity of dividing the artery between the ligatures in order to secure its complete obliteration. Gouillaud,⁴ and also Hartmann and Fredet,⁵ maintain that though oophorectomy for fibroid is out of date, and hysterectomy much in vogue, nevertheless treatment by the simpler method of cutting off the chief blood-supply of the uterus is rational and effective. Hartmann and Fredet are not surprised that removal of the ovaries is often ineffective, as it is the uterine and not the ovarian arteries that ought to be secured. Gouillaud treated successfully 1 case by simple forcipressure of the arteries for 48 hours. Hartmann and Fredet report 5 cases of ligation of the uterine arteries through a vaginal incision. In order to get at the side of the cervix easily a lateral

¹ Loc. cit.² Brit. Med. Jour., Oct. 23, 1897.³ Am. Gyn. and Obst. Jour., Feb., 1897.⁴ Ann. de Gynec. et d'Obstét., Apr., 1898.⁵ Ibid.

incision is made on each side of the usual circular cut round the cervix, and prolonged for about 1 in. down the side of the vagina. The cervix is freed for $\frac{1}{2}$ in. by scissors, then the valve of a speculum is pressed against the corresponding side of the vagina. This exposes the uterine pedicle, which is the term given by the authors, not to the broad ligament, but to the band of parametric tissue which accompanies the uterine artery. This "ligament" is denuded, drawn down, and tightly ligated. If it be thick, 2 ligatures should be applied. The silk must be tied very firmly, for experience and the principle well understood in the surgery of aneurysm show that the inner coat of the uterine artery must be divided by the pressure of the ligature, else the desired occlusion may not be effected. The cervix, directly the second uterine pedicle is secured, becomes in most cases very pale. The ligatures are cut short and the entire wound closed, after antiseptic washing, with catgut sutures. The vagina is packed with iodoform-gauze. In 4 of the 5 cases the curet was used before the operation was performed, and in 2 small cervical polypi were twisted off. All 5 cases under Hartmann and Fredet have done well. Out of 40 performed after the above method by others, no death occurred.

Ligation of the Ovarian Arteries.—According to W. Anderson.¹ Byron Robinson has ligated both ovarian arteries and broad ligaments down to and including one uterine artery. The object of ligating these arteries is to limit the supply of blood to the uterus and tumor.

Vaginal Enucleation.—This operation is most suitable for cervical fibroids. The tissues and capsule are divided down to the tumor, which is then shelled out. Sutures may be inserted to close the wound, or the cavity may be packed with iodoform-gauze. Submucous fibroid and polypoid growths springing from the endometrium are best removed by enucleation or avulsion, first freely dilating the cervical canal. The uterine cavity should be thoroughly curetted, douched, and packed with styptic sterilized gauze, as bleeding is at times quite profuse. Small subperitoneal or subserous fibroids may often be removed by the vaginal route. An opening is made in the vaginal vault anteriorly or posteriorly, according to the situation of the tumor, and the growth brought into the field. If not too large, the fibroid can be enucleated, sutures applied, and the uterus returned to its normal position with 3 or 4 sutures to close the vaginal wound. As a rule, however, subperitoneal fibroids are multiple, and vaginal hysterectomy had better be performed before the growths become too large. A. V. Wendell and W. O. Bailey² remark that removal of solitary myomata by vaginal section has become a recognized operative procedure; but until recently the uterus subject to multiple tumors was doomed to ablation. For several years they have made it a rule to attempt a conservative operation upon every case of multiple uterine fibroids, excepting those associated with an organ entirely disorganized, and they advise the early conservative removal of even very small multiple tumors in every case, when observation of several months shows any growth, particularly if any tendency to extend into the ligaments is manifested, because the sooner it is attempted the easier the operation and the better the result. They are certain that time will give vaginal section a permanent place among the methods of operative procedure for uterine myomata, by reason of the undoubted lesser danger of peritoneal inflammation, because the principle of drainage can be applied without unpleasant sequelæ, and also because the main arteries can readily be ligated at any moment, if emergency requires it.

Morcellement, or Avulsion.—[This is accomplished by dilating the uterine canal thoroughly, incising the mucous membrane over the tumor, and

¹ Loc. cit.

² Med. Rec., Jan. 8, 1898.

removing it piecemeal. Avulsion-forceps are made to grasp piece after piece of the growth, with or without the employment of scissors, until the whole is removed. The operation is tedious and is usually attended by profuse hemorrhage.] W. Anderson¹ recommends the operation for submucous fibroids or pedunculated and polypoid growths, but not for intramural tumors.

Schwartz² practises the following operation, which he calls "anterior median hysterotomy." Preliminary dilatation of the cervix with laminariants, or rapid dilatation with Hegar's bougies, and palpation of the intra-uterine growth. A semicircular incision is then made in front of the portio and the bladder is dissected away as in vaginal hysterectomy. The cervix is then incised in the median line, and, the flaps being held apart with bullet-forceps, the incision is prolonged upward until the interior of the uterus becomes accessible, care being taken not to open the peritoneal cavity. The tumor is drawn downward and removed by torsion, morcellation, or section of the pedicle, as may be required. The curet is used if necessary, the uterine cavity tamponed with gauze, and the wound closed with silk or catgut sutures. After repairing the cervical incision the vaginal wound is sutured and a vaginal tampon inserted.

Myomectomy.—H. A. Kelly³ is a hearty advocate of this conservative operation for fibroid tumor of the uterus. He declares the perfect feasibility of extracting 6, 8, 12, or even 20 or 30 myomata, large and small, and of sewing up the multiple incisions made and leaving the patient with a practically normal and functionally perfect uterus. As an operative procedure, such extensive myomectomies performed in large uteri are far more difficult to perform than the removal of the myomatous uterus. The operation requires greater technical skill, and the individual differences between the various operations are more diverse. It is therefore not a routine procedure like hysteromyomectomy. Liability to sepsis is increased from the prolonged and intimate handling of the tissues if the aseptic precautions of the operator are imperfect. Hemorrhage also is often far more difficult to control. Notwithstanding these objections, however, extensive myomectomies and multiple myomectomies are the operations of choice. The indications for the operation lie in the age and condition of the patient. If she is in good or fair condition and can stand a prolonged operation (30 to 50 minutes), and is under 37 years of age, myomectomy should always be done. Advanced years, exsanguination, or profound depression from an associated disease or complication are contraindications. J. I. Parsons⁴ claims that myomectomy is only feasible with subperitoneal tumors which have become more or less extruded from the uterine tissue and present some approach to, if not a well-defined pedicle. Such cases are uncommon, and when they do occur may produce no symptoms. In nearly every case the tumor is embedded in the uterine wall, and can only be got out by enucleation if the desire is to save the sexual organs. The operation has been chiefly supported by Schröder; but is to a great extent discarded (?) on account of its high mortality, higher even than hysterectomy. The cavity from which the tumor has been dug out very often cannot be properly closed. There is consequently great difficulty in restraining hemorrhage, while accumulation of discharges within the cavity is likely to cause peritonitis. W. Anderson⁵ states that the hemorrhage may be controlled by a temporary elastic ligature around the base of the tumor or around the neck of the uterus. Penrose regards the operation as dangerous, and prefers hysterectomy.

¹ Loc. cit.

³ Jour. Am. Med. Assoc., Oct. 2, 1897.

² Sem. gynéc.; La Gynéc., No. 2, 1897.

⁴ Lancet, July 23, 1898.

⁵ Loc. cit.

Salpingooöphorectomy.—[In cases of uterine myomata in which removal of the whole uterus would endanger the patient's life, or in cases in which the adhesions to the bowels and pelvic organs are so severe as to preclude removal of the growth, salpingooöphorectomy may be recommended. Castration, however, is not always feasible, nor are the results always successful. Menstruation may continue and severe hemorrhage necessitate further treatment. The risk of the operation in suitable cases is not great. The chief point in operating is not to leave a scrap of ovarian tissue behind, and to take the tubes away as well.]

Lawson Tait¹ reaffirms his opinion that in the case of multiple fibromyomata extirpation of the adnexa is the operation of choice, his mortality having been only 1%. Out of 108 patients, all but 2 were examined 5 years after operation. It is important to remove entirely both ovaries and tubes. He rejects intraperitoneal treatment of the stump, as well as removal of the entire uterus, practising only the extraperitoneal method.

Vaginal Hysterectomy.—J. Homans² gives the following indications for hysterectomy: 1. In intractable, often-recurring hemorrhage without discovered fibroid or malignant disease, when all the usual remedies have been tried and curetting has been done every few weeks without permanent success. Clinical reasons prevail over histologic, and practical over theoretic. 2. In all kinds of malignant disease, when the operation is possible without permanent injury to the bladder or bowels. Even if there is little hope of cure the hemorrhage may be stopped, and there are less subsequent pain and discomfort than when the disease is left to run its natural course. 3. (a) In a case of fibroid tumor which causes much discomfort or (b) threatens death by hemorrhage (and it will sometimes not only threaten, but cause it as suddenly as a pulmonary hemorrhage will). (c) Because it may increase and become too burdensome to allow life to be worth living. (d) Because it may develop a cancerous character. (e) Because by its pressure on the abdominal organs it may destroy life. (f) Because it may become cystic and thoroughly adherent. (g) Because it may be an ever-present anxiety. (h) Because it may cause edema of one or both extremities and phlebitis, to be followed, perhaps, by the passage of an embolus into the circulation, causing death by cardiac, renal, pulmonary, or hepatic disease. (i) Because it may become twisted with the uterus as a pedicle, and must be removed immediately to save life. (j) Because a very sensitive single woman, in good health and active, demands its removal on account of the disfigurement it causes. (k) Because the operation to-day, in experienced hands, is almost uniformly successful. 4. In cases of uncontrollable complete prolapse, particularly after the menopause, when pessaries and all the usual operations for holding up the uterus have been tried and found useless. 5. In case of incurable chronic inversion. 6. In cases of infection when removal of the Fallopian tubes affected with salpingitis has not cured the patient. 7. To cure puerperal sepsis where the diagnosis is as certain as it can be.

A. H. Goelet³ does not think vaginal hysterectomy for uterine fibroids is a necessary or justifiable operation, since tumors which are sufficiently small to permit removal in this manner either need not be interfered with, or, if they are causing symptoms, atrophy may be secured by dividing the uterine arteries, or an abdominal myomectomy will save the uterus.

Abdominal Hysterectomy.—W. Anderson⁴ says that the 3 main varieties of abdominal hysterectomy are: 1. The supravaginal method (extra-

¹ Brit. Med. Jour., Mar. 27, 1897.

² Va. Med. Semi-monthly, Oct. 22, 1897.

³ Am. Jour. Med. Sci., Sept., 1897.

⁴ Loc. cit.

peritoneal method). 2. The intraabdominal method. 3. Total abdominal hysterectomy. He prefers the extra-intraabdominal method of treating the cervical pedicle when it is healthy. This method is generally called the Stimson-Baer operation, and consists of ligating the uterine arteries outside of the uterine tissue. J. F. Baldwin¹ cites a modification of the technic of abdominal hysterectomy whereby he saves time, synchronously securing a smooth pelvic floor, with the slightest possible exposure of raw surface. After opening the abdomen in the usual way, by a free incision, he draws up the uterine mass and clamps the most accessible broad ligament, just outside of the ovary, the long clamp being directed downward and inward toward the uterus. An ordinary hemostatic forceps or short clamp is then attached to the upper border of the ligament next the uterus, to prevent recurrent hemorrhage through the ovarian artery. The broad ligament is then severed along the clamp first applied; the opposite broad ligament is treated likewise. The peritoneal flap is made in front of the uterus, between the tips of two clamps, the bladder separated from the uterus, and a similar but shorter flap made posteriorly. The layers of the broad ligament are separated on each side, between the clamp and the uterus, and the uterine artery is seized with a long forceps. The uterus is then detached at or below the level of the internal os, so as to give an anterior and a posterior flap of uterine tissue. The uterine mass is now removed, and the pelvis is empty and hemorrhage controlled. The uterine artery on each side is ligated. The wound is seized with a forceps next to the clamp, so as to prevent its retracting, and the clamp removed from the broad ligament. The ovarian artery is caught and drawn out from between the folds of the broad ligament, ligated with fine silk, and the projecting end cut off. The same is done on the opposite side. A long silver probe is now threaded with iodoform-gauze, about 1 in. wide, passed through the cervical canal, and seized by an assistant. The gauze is cut flush with the bottom of the wound. It keeps the cervical canal clean and insures drainage of the wound in case of oozing. The uterine flaps are brought into apposition by a running suture. With the first insertion of this suture upon one side the round ligament on that side is brought down and transfixed, so as to be implanted, when the suture is tied, between flaps on that side. This is also done with the opposite round ligament. Commencing next at the upper edge of one broad-ligament stump, the peritoneal layers are inverted, and with a kangaroo-tendon or catgut a continuous "over-and-over" suture is applied, running down the broad ligament, then across over the cervical stump, turning in the peritoneal flaps as it proceeds, and up on the opposite side. This suture should be so inserted as to draw together snugly the tissues of the broad ligaments, which, being thus singly apposed, unite so as to make in addition to the round ligaments excellent supports for the stump. The operation as thus completed leaves a perfectly smooth pelvic floor, with, at no point, exposure of any raw surface. The advantages of this method of operating are: 1. Such a shutting off of the vagina as to reduce to a minimum any danger of infection from that source. 2. The ligature placed around the uterine artery is entirely outside of the uterine wound, and being of fine material and buried in the tissues, is much less likely to give trouble. 3. The snug closing of cervical tissue prevents oozing. 4. The smooth peritoneum in the floor of the pelvis, having no projection-stump or raw surfaces, reduces to an absolute minimum the danger of intestinal adhesions. 5. The implantation of the round ligaments and puckering in of the stumps of the broad ligaments prevent prolapse of the cervical stump and vagina. 6. The use of clamps on

¹ Jour. Am. Med. Assoc., Dec. 11, 1897.

the broad ligaments obviates hemorrhage, leaves the parts in better shape for the subsequent steps of the operation, and saves considerable time.

J. Bland Sutton¹ states that he is now in the habit, whenever possible, especially when operative interference is necessary during the menstrual period of life, of reversing the conditions of oöphorectomy, so that instead of removing the ovaries and Fallopian tubes and leaving the uterus and tumor, he removes the uterus and tumor and leaves one or both ovaries with the corresponding tube. J. I. Parsons² quotes Pozzi as giving the mortality of hysterectomy by leading operators as 21.6% for the extraperitoneal operation and 25.7% for the subperitoneal operation. He would therefore not urge the operation when other methods can be adopted. Küstner³ reports 16 cases of Freund's operation, with 4 deaths. The indications were: Unusual size of the uterus (especially complication with pregnancy or fibroids), narrowness of the vagina, marked friability of the cancerous cervix, and firm adhesions, which in one instance necessitated resection of the intestine, and in another of the bladder. This method cannot, of course, be substituted for the vaginal, on account of the higher mortality, Freund's being 31.6%, while the best statistics (those of Zweifel and Redner), based on much larger series of cases, was 25%. The dangers are due not to abdominal extirpation of the uterus *per se*—i. e., to shock, hemorrhage, or ligation of the ureter—as originally pointed out by Freund, nor to the greater technical difficulties of the method, but to the risk of sepsis, especially in cancer of the uterine body, where infection is often present before operation, as shown by the existing fever. The treatment of the wound is therefore of vital importance. The writer had 2 deaths out of 5 cases in which the peritoneal cavity was closed without drainage; and 2 out of 4 in which vaginal drainage was employed. In 7 in which the Mikulicz tampon was used, however, there were no deaths; hence the inference that the latter is more effectual in preventing the escape of pathogenic microorganisms into the general cavity.

MALIGNANT DISEASE OF THE UTERUS.

Etiology of Carcinoma Uteri.—The question is now agitated by W. R. Williams⁴ whether or not ovariectomy promotes the development of cancer. In reply to those who advocate removal of the ovaries as a cure for carcinoma, he cites the following remarkable statistics: Referring to the work on *Ovarian Tumors* by Spencer Wells, in which the subsequent history of 117 patients after complete ovariectomy was recorded, it was found that the cause of death in 29 cases was unknown. Of the remaining 88 cases, no less than 32 died of cancer, or 1 in 2.75; while during the same period the average mortality of women of the same age was about 1 in 15, the mortality being five and one-half times greater in the cases in which ovariectomy had been performed, and in none of which cancer was suspected at the time of operation. In 29 cases the dates of death after operation were as follows: 10 died in the first year, 10 in the second, 4 in the third, and 5 at later dates. In endeavoring to account for these results Pfannenstiel, who has given the subject special study, offers in explanation this view—namely, that epithelial elements detached from the ovarian cystoma at the time of operation became grafted in new positions and there developed with such unwonted luxuriance as to eventuate in cancer. If future observation shall confirm this view, the indiscriminate removal of the ovaries will receive a salutary check. The

¹ Lancet, Nov. 13, 1897.

² Centralbl. f. Gynäk., No. 25, 1897.

³ Loc. cit.

⁴ Brit. Med. Jour., May 27, 1897.

question commends itself to the careful consideration of those whose lines of work give special facilities for the determination of this question. M. D. Berry¹ states that all authorities agree that few cases of carcinoma occur before the age of 30 years; after 35 years of age there is a rapid increase. After 55 years there is a diminution, but the descent is not so rapid as the ascent, the ages from 65 to 70 years being equal to those from 25 to 30 years. That this does not represent equal liability to the disease is evident from the fact that there are fewer people alive at 65 than at 25 years of age, and therefore the diminution in liability to carcinoma as age increases is far less than would appear. Meyer² has continued Recklinghausen's researches into the origin of adenomyoma and cystadenoma of the uterus, which showed how important glandular elements naturally lie embedded in nonglandular portions of the uterus and tube. He exhibited at a meeting of the Berlin Obstetric Society sections displaying glandular structures in the muscular tissue of the uterus in the adult and in new-born children. These structures, sometimes acinous, at others tubular, were histologically identical with the endometrium. But he was also able to produce sections showing adenoma clearly derived from the Wolffian duct. The clinician and pathologist will also be interested to find that Meyer demonstrated a bilateral persistence of the Wolffian duct in the vagina of a new-born infant; the left duct bore a strongly branched diverticulum, which left the main channel just before the latter entered the vaginal wall, and ran upward in the substance of the cervix. This diverticulum has been described as the true termination of the duct, which, some embryologists declare, never enters the vagina. In submucous myoma endometrial glandular tissue is often detected, as Meyer was able to demonstrate. He also showed bilateral adenoma of the tube, close to the ovum, from an adult who had died of phthisis; and also a complex condition where a cystic adenoma was of endometrial tissue undergoing cancerous degeneration, while in the peripheral part of the same uterus lay glandular structures of Wolffian origin.

Symptoms and Pathology of Carcinoma of the Uterus.—J. M. Fisher³ states that clinically, before it has spread to surrounding structures, the disease, as it appears in the cervix, may be classified as follows: 1. Superficial; 2. Parenchymatous or nodular; 3. Cancer of the cervical canal. The infiltrating extension of these various forms of the disease to the neighboring glandular structures and to the pelvic connective tissue in the pericervical and perivaginal regions sooner or later compromises the functions and the normal integrity of other important organs by involving them in the morbid process. In advanced cases the ureters become dilated from obstruction due either to pressure or infiltration of their walls, ultimately producing a condition of hydronephrosis; and through ulcerative extension one or more of the various forms of urinary or fecal fistulae may result as most distressing complications. C. G. Cumston⁴ says there are 3 types of carcinoma of the uterus—namely, the vegetating, the ulcerating, and the interstitial. The first begins in 2 ways, either producing papillary productions at once, which form on the surface of the cervix, or by a hollow, irregular ulcer, with raised infiltrated borders, which is very difficult to distinguish from a benign ulceration of the cervix. No matter what may have been the manner of the commencement of the epithelioma, it ends by the formation of a papillary fungous production, which bleeds on the slightest contact, and whose volume may increase to such an extent that it may fill the vaginal cavity. The cervix on which the neoplasm

¹ *Lancet*, Nov. 20, 1897.

² *Am. Gyn. and Obst. Jour.*, Nov., 1897.

³ *Centralbl. f. Gynäk.*, No. 24, 1897.

⁴ *Boston M. and S. Jour.*, June 23, 1898.

is implanted may be only partially invaded; but more commonly both lips are infiltrated and the orifice of the cervix is hidden in the midst of the neoplasm. At length a time comes when the culs-de-sac are invaded, and when this has taken place the disease will invade the periuterine tissues with rapidity. Considering now the cavernous type, it may be said that this is found in epithelioma which makes its appearance in the mucous membrane, which is, in the first place, infiltrated by the neoplastic cell-elements, and, later on, ulceration takes place. The neoplasm then penetrates into the subjacent tissues, and will produce circulatory troubles, such as hemorrhage, which is the result of loss of tissue from ulcerative process. Ulceration thus produced extends in depth, and after having destroyed the cervix is not long in invading the bladder, rectum, and broad ligaments. In the form of epithelioma which we are now considering the neoplasm extends in 2 different directions—namely, toward the corpus uteri and the periphery of the cervix. The vagina, on the contrary, is only involved at quite a late date, and we meet with epitheliomata which have entirely destroyed the cervix, although this destruction is not visible by vaginal examination. The cavernous type of epithelioma is usually made up of cylindric cells; at least that has been the experience of the writer. Its progress is rapid, and a fact which is most unfavorable for the patient is that it is usually insidious in its development, so that when these unfortunate subjects come to consult the surgeon the cervix will be found destroyed, and in many cases the bladder or rectum is already involved. The last type to which Cumston calls attention is the epithelioma of the isthmus, which has recently been studied by Kaminer. This form of epithelioma is, so to speak, situated in both the cervix and the corpus uteri, and gives rise to symptoms which are quite characteristic. The commencement is in most cases very sudden, and is associated with intense expulsive pains, which gradually increase with the expulsion of the new-formed mass; after a certain time an abundant, fetid, glairy mass is expelled, after which the patient is much relieved.

W. R. Williams¹ says that as the **cancerous cachexia** is less frequently caused by sarcomata than by carcinomata, and is never due to nonmalignant tumors, it cannot be attributed to mere abstraction of nutritive materials from the blood; nor can it be ascribed to septicemia, as it appears to be independent of the external lesions which usually accompany that condition, as there is generally no pyrexia, and no signs of septicemia are found postmortem. Cachectic symptoms never precede the outbreak of the primary disease, from which it may be inferred that they are a result of its local progress. They may best be interpreted as a consequence of a general toxemia, the explanation of which must be sought in the remarkable proneness of the constituent cells of cancers to undergo degenerative changes, which are often so extreme as to lead to their complete destruction by disintegration. When such excrementitious products find their way—by nutritive absorption or otherwise—into the general circulation in quantities too great to be quickly eliminated and destroyed, they poison the fluids of the body; and so, by a kind of antiointoxication similar to that by which the system is infected from an inflammatory focus, they originate the phenomena of the cancerous cachexia. Hence these symptoms are much more frequently met with in association with cancers whose cells are specially prone to degenerative disintegration (for example, the breast) than with those whose cellular elements are more stable (for example, the lip). It seems probable that the excrementitious products thus produced contain certain toxic albuminoids analogous to the virulent substances secreted by microbes.

¹ Edinb. Med. Jour., June, 1897.

These agencies cause marked qualitative and quantitative blood-changes. The total quantity of the blood is said to be diminished; its specific gravity is said to be increased; albumin and inorganic salts in the serum are less than normal. Leukocytosis is the most marked change, the white corpuscles being increased from 6000 per c.c. to 17,600 in certain cases of cancer of the stomach, to 11,400 in breast-cancer, and to 7800 in uterine cancer. Similar conditions have been demonstrated in connection with sarcomatous neoplasms; hence it may be concluded that every tumor unattended by inflammation or suppuration, causing marked leukocytosis, is due to malignant disease. It must be remembered, however, that the leukocytes are increased after meals, after hemorrhage, in pregnancy, in the new-born and dying, and in inflammatory and febrile affections. The red corpuscles and hemoglobin are greatly diminished. Pallor of the skin is marked, the straw-colored tint probably being due to altered hemoglobin taken up by the plasma of the blood; emaciation, gastrointestinal disturbances, and quasi-rheumatic pains in parts of the body remote from the primary seat of the disease occur, and peripheral neuritis has sometimes been found. Insanity has occasionally been noted. The alterations in the blood are usually accompanied by widespread fatty degeneration, and the anorexia and constipation are probably due to such changes in the liver and gastrointestinal mucosa. The general malnutrition causes changes in the bones, aside from secondary cancerous deposits, the ribs, sternum, femur, cranial bones, humerus, and vertebrae being most frequently affected. They become lighter and more fragile, probably from defective deposition of new bone to replace that absorbed. It seems probable that the affection is connected with alterations in the blood-forming properties of the red marrow; in fact, the bones most frequently so affected are those in which hematopoietic functions are normally most active. Amyloid degeneration is rarely associated with cancer. In 44 breast-cancer autopsies the writer did not meet with it, and found it in only 4 of his 78 necropsies upon cases of uterine cancer. After ulceration the symptoms of septic infection may be added to those of cancerous cachexia. Death occurred from asthenia in 64 of the author's 90 cases of cancer of the uterus which ran their natural course, and in 24 out of 40 fatal cases of cancer of the breast.

In speaking of metastasis and postoperative recurrences in carcinoma of the uterus, W. W. Russell¹ lays special stress upon the anatomic course of the lymphatic vessels of the broad ligaments, dividing them into 3 groups: (1) Those corresponding to the uterine artery and its branches and supplying the upper third of the vagina and cervix; the glands connected with this group lie at the base of the broad ligament and at the dividing-point of the iliac vessels. (2) Those supplying the greater portion of the uterine body, running along the upper surface of the broad ligament with the ovarian vessels and terminating in the lumbar glands about the level of the lower border of the kidney. (3) Those arising in the uterine cornu and passing out into the round ligament to the inguinal glands. He draws the following practical deductions from his cases: 1. Cancers of the vaginal portion tend to advance on the vaginal walls; they are usually epitheliomata and have little tendency to metastases. 2. Growths of the cervix are usually adenocarcinomata; they must be considered the most malignant of uterine cancers, and tend to spread into the parametrium and bladder. 3. Adenocarcinomata of the body are the most accessible to operation and give the best results. 4. Hysterectomy for fundal cancer should include an extensive removal of the broad ligaments, tubes, ovaries, and round ligaments.

¹ Am. Jour. Obst., p. 851, 1896.

Diagnosis of Uterine Carcinoma.—[All writers emphasize the importance, from a diagnostic point of view, of the occurrence of hemorrhage.] L. G. Baldwin¹ says that the one sign of malignant disease of the uterus which should always be investigated, and especially when it occurs at or near the menopause, is hemorrhage. In some cases the bleeding is caused by coition at a period earlier than that at which any derangement of the menstrual flow is noticed. This is especially true when the disease has its origin in the cervix. Another comparatively early symptom is an intermenstrual, watery, irritating discharge, not necessarily foul-smelling. E. J. III² says that early diagnosis from subjective symptoms belongs to the difficult problems. Exhaustive physical examination is necessary to confirm the suspicion. The ulcerating epithelioma of the cervix is easily known by its distinct, hard edges, the hardness extending somewhat beyond the ulcerating portion. The bottom of the ulcer is remarkably hard, but so friable that a curet will easily remove a large piece. A tenaculum will take no hold in it. Through the speculum it appears as covered by a dirty grayish matter. The ordinary erosion, on the contrary, appears of a red color, has no infiltration of its edges, and is smooth and velvety to the touch. The curet will make little impression on it, except to remove a very superficial layer. The syphilitic ulcer will be recognized by its general symptoms. Carcinoma of the body cannot be diagnosed in its earlier stages by palpation. When carcinoma of the cervical canal exists it will be seen only when the cervix is dilated and the curet removes the friable masses. By palpation the cervix is found enlarged, and hard, deep-seated nodules are felt.

Treatment of Carcinoma Uteri.—1. *Palliative.*—Winter and Schmitt³ made use of Denissenko's treatment of cancer in 14 cases of uterine carcinoma. They employed the watery extract of *Chelidonium majus* as a subcutaneous injection, applied to several points in the abdomen once a week. In no case was there the least improvement; but in several the infiltration seemed to extend with unusual rapidity, and ulceration advanced with greater speed than before. Denissenko claims that the drug lessens the rapid disintegration of tissue and even brings about encapsulation. No such improvement was seen in any of Winter and Schmitt's cases. In 3 instances, they admit, hemorrhage was checked. In all the general health was unfavorably influenced, deteriorating far more rapidly than in untreated cases of cancer too far advanced for surgery. The injections caused severe pain. Winter and Schmitt conclude that chelidonium should be rejected as a drug for cancer.

Freudenberg⁴ has been applying a 50% solution of the extract of *Chelidonium majus* locally by means of a cotton swab. This method is free from pain, and produces shrinking of the tumor and checks the morbid secretions. In some cases it also arrests the uterine hemorrhage. It exerts no influence upon the growth of the tumor. He repeats the application once every 2 to 4 days. In severe hemorrhages and rapid hyperplasia he employs high vaginal tampons, saturated in chelidonium, once a day. The extract may be diluted by weak antiseptic solutions. Robinson⁵ treated 2 patients suffering from advanced cancer of the uterus in the following manner, with good results: Through an abdominal incision the uterine and broad ligaments were divided to relieve the pain which their tension caused. The ovarian and uterine arteries were ligated. By means of a long needle alcohol was injected per vaginam into the indurated tissues about the uterus every third or fourth day,

¹ Med. News, Mar. 5, 1898.

² Med. Rec., Oct. 9, 1897.

³ Centralbl. f. Gynäk., No. 27, 1897.

⁴ Ibid., No. 30, 1897.

⁵ N. C. Med. Jour., July 5, 1897.

at first 30 minims, and then an increased amount up to 100 minims. The injections were rather painful, and were followed by a flushed feeling. After 2 months' treatment there was a cessation of all discharge and odor in 1 case; while pain was abolished, irritability of the bladder was much reduced, and the general condition of the patient greatly improved. There was a marked diminution of the indurated area. The other case showed similar improvement. The cautery has been used by Mackenrodt, Czempin, and Brink in the treatment of carcinoma. Czempin,¹ after thoroughly curetting the affected portions, cauterized the diseased surface with a red-hot iron, so that a hard crust was formed. Two or three yards of a 2-in. strip of iodoform-gauze were then saturated with a solution of the sesquichlorid of iron and packed into the uterine cavity. This was removed after 3 days, and daily irrigations of lysol made. When the slough comes away a mass of zinc paste is introduced. The scar formed by this method is a firm one, and pain and discharge are banished for months or even for years. Brink² endeavors to answer the question, Does cauterization prevent infection? by experiments on animals. Guinea-pigs were etherized, the abdomen opened, and an eschar made on the peritoneum with a glowing platinum wire. Without disturbing the wound, it was touched with another wire dipped in a staphylococcus-culture. The wound was then closed and sealed with iodoform-collodion. Two days later the animals were killed, the abdomen incised with a cautery-knife, and the eschar removed with aseptic precautions. In all the cultures made from the tissue immediately beneath the lesion colonies of *Staphylococcus aureus* were obtained which were inoculated with the usual results. In animals killed from 6 to 10 days after the primary inoculation the microorganisms were found in the deeper tissues. The writer infers not only that an eschar does not prevent the penetration of pathogenic organisms into the subjacent tissue, but that it probably fails to prevent reinfection of raw surfaces during operations for cancer. Hence the results claimed for igni-extirpation of the cancerous uterus are open to considerable doubt. Berton³ reports the results of curettement and cauterization in 100 cases of incurable carcinoma of the uterus treated in Winckel's clinic. In 60.8% of the cases a temporary improvement was observed as regarded the hemorrhage and foul discharge; but pain was relieved less often. In 32 cases a moderate rise of temperature followed the operation. One patient died of exhaustion after the curettement had been repeated 3 times. Mackenrodt⁴ emphasizes the difference in technic between vaginal extirpation of the cancerous and noncancerous uterus. In the latter case the operation is simplified by the fact that the surgeon can keep close to the organ, thereby diminishing the amount of hemorrhage and running less risk of injuring the surrounding tissues. In operating for malignant disease, however, the incision through the vaginal fornix must be as remote as possible from the cancerous cervix, while the risk of secondary infection is great. During the past two years and a half the writer has used the cautery exclusively for separating the uterine attachments, with the result that during that period he has not observed a single case of recurrence in the cicatrix, and only 1 patient has died, from meta-stasis in the stomach. He at first used the Paquelin, but has abandoned it for the actual cautery, which he has employed in 30 cases. In order to avoid delay he has 3 cautery-irons, which can be raised to a glowing heat in a minute by means of a gas-burner fitted with a blowpipe, so that as fast as one iron cools another is ready. There is some danger of injuring surrounding parts, but with practice this can be certainly

¹ Der Frauenarzt, May, 1897.

³ Inaug. Diss.: Centralbl. f. Gynäk., No. 43, 1897.

² Centralbl. f. Gynäk., No. 2, 1898.

⁴ Ibid., No. 25, 1897.

avoided. While the immediate mortality is somewhat higher than by other methods—it is far less than that of abdominal extirpation—the results as regards freedom from recurrence are such that he confidently believes that “igni-extirpation” will be the operation of the future for the removal of cancerous growths in all localities, even in the rectum.

R. Bell¹ refers to an interesting statement recently made by Snow, to the effect that hypodermic injections of morphin and cocain delay, if they do not actually prevent, recurrence of scirrhus after operation. If this is a fact, he says, one is warranted in inferring that certain agents which are safe therapeutic remedies may be discovered to produce destructive effects upon morbid growths where these have established a habitat in a debilitated tissue. He claims to have had during the past two years most excellent results from a course of local treatment the object of which has been to promote a healthier condition of the organ, while this has been supplemented by the administration of thyroid extract. The local treatment consists in removing by the curet all the unhealthy tissue that can be reached, and the application afterward at frequent intervals of tampons saturated with a 10% solution of ichthyol in glycerin.

[An interesting question of recent origin is the effect of **oöphorectomy upon inoperable carcinomata** of the breast and uterus. The idea originated in a suggestion made by G. Beatson at a meeting of the Edinburgh Medico-Chirurgical Society 2 years ago, that some pathologic condition of the ovaries was the exciting cause of cancer of the breast. Denying the parasitic theory, he held that cancer-cells would ultimately be shown to be germinal epithelial cells. It is undoubted that there is some connection between the mammary glands and the reproductive organs, and the breast is one of the commonest seats of cancer. Impregnation and gestation set up a normal evolution in the breast, and it seems not unreasonable to assume that an abnormal stimulus may explain cancer. Beatson's experience and that of Stanley Boyd, Watson Cheyne, and others have certainly proved that removal of the ovaries does influence the growth of the cancer. But though the influence of the ovaries on the mammary gland appears manifest, it is equally certain that it is transitory. Experience thus appears to prove that the operation influences cancer of the breast favorably, but not permanently, and it is probable that the operation of oöphorectomy for this purpose will fall into disuse.] The following reports have appeared recently: W. W. Cheyne² reports 2 temporary successes, followed by a recurrence of the growth. F. Hobday³ reports 3 cases in which the operation was performed upon bitches suffering from cancer of the vagina, with apparent cure in each case. W. R. Williams⁴ states that the cancer-mortality is nearly $5\frac{1}{2}$ times greater for those whose ovaries have been extirpated than for those who have undergone no such operation. Of 32 cancer-cases, in 19 the seat of the disease is not stated, in 3 it was peritoneal, in 3 uterine, in 2 in the pedicle, in 2 rectal, and in 1 each in the lung, liver, and kidney. The date after ovariectomy at which death from cancer supervened is stated in 29 cases: 10 died in the first year, 10 in the second, 4 in the third, and 5 at later periods. In none of the foregoing cases was there any reason to suspect, at the end of ovariectomy, that malignant disease was present. In 6 of the 32 operations it is distinctly stated that both ovaries were removed. S. Boyd⁵ thinks that it is in the highest degree improbable that the relationship between oöphorectomy and atrophy of the cancer is other than causal. How removal

¹ Scottish M. and S. Jour., July, 1897.

² Ibid., July 17, 1897.

³ Brit. Med. Jour., May 7, 1898.

⁴ Ibid., June 12, 1897.

⁵ Ibid., Oct. 2, 1897.

of the ovaries can produce such an effect he does not know; but his working-hypothesis is that the internal secretion of the ovaries in some cases favors the growth of the cancer, acting either upon the epithelial cells or upon the surrounding tissues; consequently, in these cases, removal of the ovaries will leave the tissues better able to cope with the parasitic cells. He reports 5 cases operated upon with satisfactory results to date; also, a case of cancer of the uterus which was temporarily relieved by the operation. G. E. Herman¹ urges a combination of the operation with the administration of thyroid extract in order to insure good results.

2. *Radical (Operative) Treatment of Uterine Carcinoma.*—Goubareff,² in a discussion before the International Medical Congress at Moscow, on the best method of extirpating the cancerous uterus, affirmed that the operation of the future is the abdominal, since it allows thorough removal of affected glands, such as is practised in amputation of the breast. Küstner believed that in early cases the vaginal route was preferable, the thorough use of the cautery being advisable to prevent primary wound-infection. Freund's operation undoubtedly permits freer access to the diseased parametric tissues, but is more dangerous than vaginal hysterectomy. He preferred to close the vagina and to drain through the vaginal wound, since his mortality after suturing the peritoneum, and also after draining per vaginam, was 50%. Olshausen said that he had ceased to operate in cases in which the disease had extended beyond the uterus; for those who desired to do so, the abdominal route was undoubtedly the best. Contrary to the common belief, the prognosis as regards a radical cure was better in cases of carcinoma of the cervix than of the portio vaginalis, since in the former the disease could often be entirely removed, while in the latter the vagina was early involved. He uses catgut ligatures, fixes the stumps in the wound, and closes the peritoneum.

Lauphear³ says that the radical operation is indicated: 1. Whenever there is a fungous growth upon the cervix (especially in a patient near the menopause) which persists in spite of treatment, even though there is no ulceration and but little tendency to spread. It is probably the papillary form of carcinoma cervicis; and there is always involvement of the mucous membrane of the body, so that high amputation will not cure. 2. When there are one or more nodules in the mucous membrane of the cervix, which soon ulcerate and destroy the mucosa. Such trouble is almost invariably the nodular variety of carcinoma of the cervix. 3. When there is an infiltrate in or beneath the cervical mucous membrane just within the os, which soon breaks down and destroys the cervix by erosion. It constitutes the variety known as cancer of the cervical mucous membrane, and may change when viewed through the speculum. 4. When there is evidence of the existence of cancer of the parenchyma of the uterus, even if the cervix seems to be perfectly normal. Such cases are not rare. 5. Whenever a glandular endometritis becomes inveterate, showing a tendency to degenerate into a typical malignant adenoma at the menopause; as indicated by (a) the appearance of irregular hemorrhages; (b) the presence of a serous, reddish, odorless discharge; and (c) paroxysmal pain. 6. In all cases in which there is even a strong suspicion of malignant disease. In early operation lies safety. Hysterectomy should not be performed under the following conditions: 1. Whenever the disease is so far advanced that the uterus is fixed in the pelvis. 2. Whenever it is certain there is extensive cancerous infiltrate in the broad ligament. 3. Whenever the cancer involves the bladder. Implication of the posterior wall, or even of the anterior part of the

¹ Lancet, June 11, 1898.

² Centralbl. f. Gynäk., No. 38, 1897.

³ Internat. Jour. Surg., Aug., 1897.

rectum, is not necessarily a positive contraindication to operation. 4. When the "cancerous cachexia" has become pronounced. 5. When the patient is too weak from repeated, exhausting hemorrhages. 6. Whenever the diagnosis of sarcoma of the uterus is quite certain. Such cases always recur after removal and the patients die quickly.

Chalot¹ has attempted to find a method of hysterectomy which will be far more radical than the usual methods of removal, either through the vagina or through an abdominal incision. The necessary points of a perfect operation are: (1) Removal of the diseased tissues in one mass by an incision wide of the new growth; (2) careful excision of all affected glands. According to the writer, these principles can only be carried out by means of a celiotomy with the patient in the Trendelenburg position, the removal of the uterus being preceded by ligation and division of the internal iliac arteries, and by transplantation of the ureters. The transplantation of the ureters may, if more convenient, follow the excision of the uterus. Either the rectum or, in some cases, the bladder may serve as the receptacle of the urine. These 4 steps of the operation constitute a new method of hysterectomy, called by the inventor "ultraureteral hysterectomy."

Vaginal Hysterectomy.—Several important papers on this subject have been contributed during the year. J. Homans² mentions the following indications for the operation: (1) In intractable recurrent hemorrhage, without apparently any fibroid or malignant disease, and after all the usual remedies have been tried. His idea is that "clinical" reasons should "prevail over histologic, and practical over theoretic." (2) In all varieties of malignant disease where injury to bladder or bowel is avoidable. He also recommends the procedure in cases where there is no hope of permanent cure, as there is less discomfort and pain. (3) In fibroids, which either cause much local discomfort, threaten death by hemorrhage or cancerous degeneration, become cystic, or where the uterus becomes twisted owing to rotation of the tumor. (4) In complete procidentia, particularly after the menopause, after the usual plastic operations and pessaries have been tried. (5) In cases of chronic uterine inversion where replacement cannot be effected. (6) To cure puerperal sepsis.

Thorn³ calls attention to the contrast between the present low mortality of vaginal hysterectomy for carcinoma uteri (1% to 5%) and the high percentage of recurrences. Hardly 30% of the patients have been well at the end of 5 years. This unfavorable result he attributes, not to the operation, but to the fact that 70% of patients are found to be inoperable when first examined; while in a considerable proportion of those operated upon the disease has already extended beyond the uterus. The latter cases should be carefully separated from those in which the conditions are favorable for a successful extirpation, since in nearly all cases recurrence takes place in the cicatrix within 2 years. Recurrence due to infection during the operation occurs in only 10%; hence the claim of Mackenrodt for his method of "igni-extirpation" is not based on facts. The writer regards it as a step backward. Of 62 cases in his practice (mortality, 1.6%), 27 patients had a recurrence within 2 years, all being "unclean"—i. e., the disease was not confined to the uterus at the time of the operation. Of 32 favorable cases, only 2 had recurrence within 2 years. Seventeen patients had been operated upon six or more years before; 23.5% were free from recurrence. The writer believes that Freund's operation is indicated in certain cases, but he rejects the sacral method on account of the high mortality. Improvement in statistics will not be accomplished, he

¹ Centralbl. f. Gynäk., Nov. 13, 1897.

² Am. Jour. Med. Sci., No. 305, 1897.

³ Centralbl. f. Gynäk., No. 40, 1897.

says, by devising new surgical methods, but by early diagnosis and early resort to a radical operation. Without the intelligent cooperation of the family physician, it is vain to expect any better results than those which have already been obtained.

C. L. Hall¹ remarks that despite statistics showing many apparently permanent cures on high authority, we are forced to the conclusion that most cases of uterine cancer presented are inoperable; at least, by the vaginal route. With these discouraging conditions confronting us, and bearing in mind the limited field of operation, the accepted infectiousness of cancer-tissue, and the possibility of the transference of living tumor-cells during an operation, coupled with the impossibility of removing in many cases *all* of the diseased structure, we are forced to admit that the removal of the uterus per vaginam for malignant disease is, in the majority of cases, a doubtful expedient. Complete cures are rare, even when the carcinomata are extirpated very early in their course. As a rule, one recurrence follows another, until the patient succumbs to general exhaustion. In view of the opinions of some of the leaders in medical thought, we are compelled to look further for other and better methods of procedure in dealing with malignant disease of the uterus. It is probable that any plan of complete extirpation will be found inadequate in a large percentage of cases; but that method which permits of the greatest opportunity for inspection of the diseased uterus, adnexa, and infected glands, and furnishes an opportunity for a more complete removal of all diseased structures, both primary and secondary, must ultimately become the operation of election. The dexterity which has characterized American surgeons in abdominal section for the total removal of the uterus and appendages leads to the belief that in the near future vaginal hysterectomy for malignant disease will be restricted to those rare cases in which women present themselves in the inception of the disease, and before secondary infection has taken place. It is the opinion of the writer that the more radical operation known as the Clark method will supersede vaginal hysterectomy for cancer. By this abdominal method of total extirpation of the uterus and adnexa the posterior peritoneum and all glands at the bifurcation of the iliac vessels are brought into view and removed, whether infected or not. We are thus enabled to go beyond the inflammatory zone and to remove diseased glands which are not within reach by the vaginal route. The bladder, the ureters, the rectum, and all other important structures are brought directly into the field of vision. Thus directed, the hand of the operator does thorough work, and the poor sufferer has done for her the best that the science and the art of surgery can offer. The objection urged against this operation—that it is tedious, that too long exposure results, that prolonged anesthesia endangers the patient's life—will all be overcome by that practice which makes perfect.

AFFECTIONS OF THE PELVIC VISCERA.

The Diagnosis of Pelvic Disease.—Sonnenberg² calls attention to the difficulty in diagnosis between appendicitis and diseases of the adnexa, especially in cases in which the appendix is of unusual length or the abscess is situated low down. The immobility of the latter is an important point, though the same peculiarity is noted in carcinoma of the ileocecal region with exudate. In cancer, however, stenosis of the gut is apt to be present. The writer believes that the relative frequency of appendicitis in the male has been exaggerated, since in his experience 60% of males and 40% of females were

¹ Med. News, July 17, 1897.

² Deutsch. med. Woch., No. 40, 1897.

affected. The comparative immunity of women from the more severe sloughing processes may be due to the fact that in this sex the appendix has an additional blood-supply through the appendiculo-ovarian ligament, a special fold of peritoneum connecting the process with the right ovary. Appendicitis is more likely to be mistaken for inflammatory disease of the right ovary and tube than the reverse. The history of previous pelvic trouble, especially of the extension of gonorrheal infection, is important. It is rare for inflammation of the tube to occur without previous disease of the uterus. The situation of the tumor at the right horn of the uterus and the absence of intestinal symptoms are important. The exudate surrounding diseased adnexa is readily felt per vaginam, being usually situated in Douglas's pouch. Pain and tenderness are noted at a lower level in tubal and ovarian disease, the pain seldom being referred to the stomach and umbilical region, as at the outset of appendicitis, while there is less general disturbance. Tympanites is more marked in connection with the latter.

Delagénère¹ states that the appendix in these cases is subject to very chronic inflammatory change of the usual follicular type. Diagnosis is highly important, as abdominal section is required; removal of the appendages by the vagina is useless, since the part of the disease which lies in the vermiform appendix would be out of reach. Hence when sudden attacks of pain in the right iliac fossa, not associated with the catamenia, and gastrointestinal disturbance are added to definite symptoms of disease of the appendages, the pelvis should be explored from the abdominal side. If the diagnosis be confirmed, the vermiform appendix as well as the tube and ovary proving diseased, the former must be removed as well as the latter. Delagénère believes that the disease of the appendix is secondary to inflammation of the uterine appendages, being propagated by contact, adhesion, and abscess. The method of resection is the same as for primary disease of the appendix.

L. Pick² has found that infection by the *Bacterium coli commune* is very rare in comparison with other bacteria, he having found it in only 4 of 122 cases of pyosalpinx, only twice in 17 cases of nontuberculous peritonitis, and twice in 247 cases of puerperal sepsis with fever. Therefore in 423 gynecologic and puerperal cases the *Bacterium coli commune* was found in only 9. In answer to the question, Does the course of the disease give any indication of its origin? Pick says: "If in any infectious disease the temperature shows decided and regular remissions, this may be an indication of the presence of streptococci." The temperature shows no similar characteristic indication in *Bacterium coli commune* infection. The production of gas is not limited to this bacillus and is not pathognomonic. Infection of this type is characterized more by the absence than by the presence of symptoms. Therefore the course of the disease gives no indication of its origin.

The Abdominal Reflex in Women.—Bodon³ believes that the abdominal reflex possesses a certain diagnostic value in doubtful cases. In pelvic cellulitis the reflex is not affected; while in pelvic peritonitis it is either diminished or weakened upon the affected side. Hence when a doubtful tumor is discovered on one side of the pelvis, and no difference in the belly-reflex is found on the affected side, it may be inferred that the mass is situated in the pelvic connective tissue. If, on the contrary, the reflex on the affected side is weakened or absent, it is probable that the peritoneum is involved—*i. e.*, there is an exudate around the tube and ovary, or a pelveoperitonitis. In acute cases the writer often observed that when the abdomen was lightly stroked

¹ Ann. de Gynéc. et d'Obstét., Dec., 1897.

² N. Orl. M. and S. Jour., Mar., 1898.

³ Centralbl. f. Gynäk., No. 5, 1898.

over the affected side the patient was suddenly seized with a violent pain, which was entirely out of proportion to the mechanical irritation. This is probably explained by the movements of the inflamed peritoneum caused by slight, invisible contractions of the abdominal muscles. In one case the pain was felt on the healthy side. From further experiments upon the round ligaments the writer concludes that these are the analogues of the cremasters in the male.

The Influence of Castration upon the Uterine Mucous Membrane.—Cohan¹ records the results of his investigations to determine the changes in the uterine mucous membrane following castration. The investigations were made upon 20 rabbits. The mucous membrane and uterine wall were examined as early as 24 days, and as late as 10 months, after the ovaries were removed. In order to compare the induced changes with those occurring normally at the menopause, he examined also the uteri removed from 4 elderly women. He concludes that an inevitable result of removal of both ovaries is atrophy of the uterus. This atrophic change also involves the uterine mucous membrane; the glands and superficial epithelium die as a result of the retrogressive changes, and the cell-elements of the stroma-tissue are modified into connective tissue, as occurs in the postclimacteric period. The processes seen in the uterine mucous membrane resemble those which precede the menopause. The pure form of senile atrophy here observed is not identical with endometritis atrophicus. The cause of the changes found in the genitals after the removal of both ovaries is unknown. Ligation of the tubes and ovarian arteries has no influence. From an anatomic standpoint castration expresses itself as changes in the blood-vessels of the uterus.

Elastic Tissue in the Fallopian Tubes.—Buchstab,² from a careful study of 102 specimens of normal and diseased tubes removed from children and women, arrives at the following conclusions: 1. Until the end of the first year elastic tissue is found only in the peritoneal and subserous coats of the tube around the vessels. 2. Between the ages of 3 and 7 this tissue becomes thicker, especially in the neighborhood of the vessels, and fibers are seen in the muscular layers. A few delicate fibers appear in the submucosa. 3. In the tubes of girls between 12 and 13 years of age this tissue is well developed, the vessels being surrounded by a dense network. The muscularis mucosæ contains a small quantity, but it is absent from the mucosa. 4. Between 14 and 15 there is a great increase in the amount of elastic tissue throughout the different layers, and for the first time delicate fibers are observed in the mucosa. 5. In women between 21 and 45 this tissue reaches its full development; while after the climacteric it begins to atrophy, reaching its minimum at the age of 55 years. 6. In the senile tube elastic tissue is found only in the serosa and superficial muscular layer. 7. There is a notable increase in hydrosalpinx and pyosalpinx, so that in some specimens the elastic tissue formed actual layers; while in tubal gestation it is absent or slightly developed at the site of the sac, whether the latter has ruptured or not.

Salpingitis.—Mundé³ believes that, like all mucous membranes, the endometrium is subject to influences which will produce a congestion or hypersecretion, and eventually a hyperplasia of its tissues, such as occurs in other mucous membranes of the body. He believes that exposure to cold which will produce a coryza, a pharyngitis, a laryngitis, or bronchitis, may produce the same result in the mucous membrane lining the cavity of the uterus. A

¹ *Centralbl. f. Gynäk.*, No. 32, 1897.

² *Ibid.*, No. 28, 1897.

³ *Med. Brief*, May, 1897.

catarrhal endometritis is quite as possible as a catarrhal rhinitis or laryngitis. It is certain that a very great number of cases of endometritis, chiefly of a chronic variety, are seen in young girls and in unmarried women, undoubted virgins, in whom absolutely no other cause can be ascertained, after thorough investigation, for the catarrhal endometritis, than a succession of exposures to cold, usually some imprudence near or during the menstrual period. The symptoms in such cases are more or less irregularity of the menstrual discharge—usually an increase—and the gradual appearance of a yellow, irritating discharge in the intermenstrual epochs. Physical examination reveals a gaping external os, an erosion of the lips, and, emerging from the uterine canal, a thin, yellow, acrid discharge. There are other causes for salpingitis, most common of which is the hyperemia of all the pelvic organs following parturition, whether at term or premature. We have the endometritis of subinvolution and may have the catarrhal salpingitis of subinvolution. One of the most common causes of the violent forms of salpingitis is septic infection following childbirth. Septic infection outside of the puerperal state may also produce salpingitis, such infection being due to operations on the endometrium in which careful antisepsis has not been employed, as in dilatation, sounding, curettement, and intrauterine medication. Finally infection of the uterine canal by the gonorrheal poison is undoubtedly one of the most certain factors in the production of an acute virulent salpingitis. There can be no question that a man who suffers from an acute, subacute, or even chronic gonorrhea will almost inevitably infect a woman with whom he has intercourse; a gonorrheal vaginitis will be the first, a gonorrheal endometritis the next, and a gonorrheal salpingitis the final immediate result of the infection. Salpingitis is a very frequent disease. The early stage of the catarrhal form is not so frequently seen; but the later stages, with various enlargements, hypertrophies, and distortions of the tubes, with or without adhesions, are frequently encountered.

Varieties.—Anatomically and pathologically considered, Mundé states that there are two chief varieties of salpingitis—namely, the catarrhal and the purulent. Of these there are a certain number of subdivisions, as follows: I. *Catarrhal Salpingitis.*—1. Acute, simple, or endosalpingitis. 2. Chronic: (a) diffuse or interstitial (myosalpingitis), pseudofollicular, hemorrhagic; (b) nodular isthmic salpingitis, chronic vegetating salpingitis. *Results.*—Hydro-salpinx, salpingitis profluens, hematosalpinx. II. *Purulent Salpingitis.*—1. Acute, septic (puerperal and nonpuerperal). 2. Chronic interstitial salpingitis. 3. Tuberculous salpingitis. 4. Perisalpingitis. *Result.*—Pyosalpinx.

The *acute simple endosalpingitis* is very rarely seen, and its existence is denied by many authorities. It does, however, exist, and is called endosalpingitis because it is confined entirely to the lining membrane of the tube, and does not affect either the muscular walls or the peritoneal covering. The change in the mucous membrane consists merely in an increased vascularity with consequent hypersecretion. The most frequent cause is exposure of more or less of the cutaneous surface to cold, or a checking of pelvic congestion by the use of cold injections; it is also caused by too frequent coitus. The symptoms are more or less constant and acute pain, persisting for several weeks or months, in one or both ovarian regions, with tenderness in these regions. As a rule, there is no rise of temperature and the patients are seldom confined to bed. As a result of an uncured or frequently recurring catarrhal salpingitis, not only does the mucous membrane of the tube become hypertrophied and the secretion of its glands augmented, but the muscular and areolar tissue of the tube gradually hypertrophies, so that in time the diameter

of the tube is increased and its lumen proportionately diminished. The secretion becomes turbid and scanty, and more akin to mucus. This constitutes a *chronic interstitial myosalpingitis*. The symptoms are simply an aggravation of those of the acute catarrhal form. A decided enlargement of the tube may be detected. *Pseudofollicular salpingitis* is merely a subdivision of chronic interstitial catarrhal salpingitis, and consists in the formation of a certain number of sacs in the course of the tube by the obstruction or agglutination of its walls. The catarrhal secretion accumulates in these sacs and the tube is distended like a row of beads on a string. In *hemorrhagic salpingitis* blood is effused in consequence of the accidental rupture of a blood-vessel. In *nodular isthmic salpingitis*, which is not very common, there is an irregular inflammatory hypertrophy of the walls of the tube, forming nodules or bunches in different spots, and giving the tube very much the same appearance as in pseudofollicular salpingitis. The difference simply is that the enlargements are solid, hypertrophic, and do not contain mucus or mucus. *Chronic vegetating salpingitis* is a hypertrophy of the mucous membrane of the tube largely in excess of that found under ordinary conditions of salpingitis. It is rare. *Profluent salpingitis* means an intermittent accumulation of mucoserum in the cavity of the tube as a result of chronic catarrhal inflammation, which fluid is evacuated from time to time into the uterine cavity in consequence of the slight obstruction at the uterine end giving way to the steady pressure of the accumulated fluid. By *purulent salpingitis* is meant inflammation of the lining membrane of the tube which is at the very onset of a virulent type, and is characterized by the secretion of pus instead of mucus or serum. It is due either to septic infection or infection with the gonorrheal poison. In *tuberculous salpingitis* there is an infiltration of the lining membrane of the tube and more or less of its walls with tuberculous nodules, giving rise to a purulent discharge. The manner of infection is still in doubt. E. Ries,¹ who has made a study of the nodular forms of tubal disease, concludes that nodular enlargement of the tube can be caused by a number of different pathologic conditions, the diagnosis of the nature of the tubal nodules only being made by the aid of the microscope. The conditions causing nodular enlargement of the tube are congenital or acquired, noninflammatory or inflammatory. Any one of these conditions may exist without the production of nodules. The nodules may be found in all parts of the tube and—taking the peculiar anatomy of each part of the tube into account—show the same structure. The enlargement may be caused by epithelial or epithelioid formations, connective or muscular tissue, by round-cell infiltrations, or combinations of two or more of these. The epithelial formations originate in the epithelium of: (a) The tubal mucous membrane (salpingitis pseudofollicularis, adenomyoma originating in the tubal epithelium). (b) The accessory tubes (intraparietal parasalpinx and hydroparasalpinx). (c) Remnants of the Wolffian body (adenomyoma). The epithelioid formations originate in the peritoneal endothelium. The excess of formation of connective tissue is a consequence of inflammatory conditions of the tubal wall (salpingitis interstitialis). The epithelioid formations can occur wherever pseudomembranes cover organs lined with a serous coat. W. R. Pryor² states that septic endometritis occurring in the multiparous uterus does not often produce pyosalpinx or ovarian abscess. The type of salpingitis caused by streptococci and staphylococci is not so severe as that which follows gonorrhea, unless the process occurs postpartum or postabortion. The septic cocci follow along the lymph-streams as well as along the tubes; and only after infection following conception do we find the former sufficiently developed to

¹ Jour. Exper. Med., July, 1897.

² N. Y. Polyclinic, June 15, 1898.

be factors in carrying the poison. Septic processes in the uterus damaged by the traumatism of abortion or labor are always more active than in the non-pregnant and uninjured organ.

Tuberculous Salpingitis.—M. H. Parmelee¹ states that tuberculous tubes are covered with the characteristic cheesy deposits, more particularly in, on, or about the fimbriated extremities; or miliary tubercle may predominate. Tubercle in the tubes or ovary, or the peritoneum, comes as an infection, and may occur in a number of ways, as through the blood; through a tuberculous ulcer of the intestine or bladder; through the genital tract—from bed-clothing or sheets soiled by sputum; through coitus with men affected with genitourinary tuberculosis. The disease, according to O. F. Blankingship,² is much more frequent in the female—in the proportion of 2 to 1. It may be primary, but is generally secondary to tuberculous disease elsewhere; and tuberculous peritonitis, which may also be primary, is generally secondary to tubal or intestinal tuberculosis. Tuberculosis of the Fallopian tubes is not at all uncommon. It is generally bilateral, and produces a most characteristic form of salpingitis, in which the tubes are enlarged, the walls thickened, infiltrated, and nodular, and the contents of the tubes cheesy. The peritoneal form is more frequent in the negress than in the white woman. A. Hegar³ distinguishes both an ascending and a descending form of tubal and pelvic peritoneal tuberculosis. In the former the bacilli are derived and introduced from the feces of those suffering from intestinal tuberculosis, from the fingers and instruments of the doctor or midwife, or from the seminal fluid of men having tuberculous orchitis (though this last method of introduction of bacilli is very improbable). In the **descending** form the bacilli come from the intestines or from degenerated mesenteric glands, and thus the peritoneum is invaded; and perhaps from the now diseased peritoneum the bacilli gain access to the ostium tubæ through its fimbriated extremity. The gross changes in form and position of the tube are similar in its different inflammatory conditions. The diagnosis-points for tuberculosis of the tube are nodular swelling of the isthmus tubæ, and perhaps, also, a similar condition of the interstitial portion of the tube. If in rectal or vaginal examination one feels nodules of the size of a pea or bean, or even larger, on the posterior uterine surface, in Douglas's pouch, on the posterior leaf of the ligamentum latum, on the posterior portion of the lateral pelvic wall, along the sacroiliac joint, in the paravaginal tissue, then the diagnosis of pelvic-peritoneal tuberculosis may be made; yet the physician must think of the possibility of sarcomatous and carcinomatous metastases, metastases of tubal cystomata, small fibroids, and isolated inflammatory thickenings of the serosa. In only 1 case could Hegar establish the diagnosis of tubal tuberculosis by microscopic examination of uterine scrapings. Of importance, as pointing to a tuberculous infection of the uterine adnexa and peritoneum, are tuberculous disease in other organs or residua of the same, and also the general nutritive disturbances similar to those observed in tuberculosis of other portions of the body. Hegar describes the effect of the local tuberculous disease upon the development and function of the neighboring organ. In 3 cases he found a very small and infantile uterus; 2 of these patients had never menstruated, though past the age of puberty. Without doubt, cases of tubal and peritoneal tuberculosis undergo a spontaneous cure fairly often, though the writer does not deny the value of laparotomy in some of these cases. He condemns laparotomy in the old and indolent forms of the disease. He advises this operation in those in whom

¹ Clinical Reporter, Dec., 1897.

² Va. Med. Semi-monthly, Apr. 22, 1898.

³ Deutsch. med. Woch., No. 45, 1897.

there have been for quite a long time inflammatory processes, and in whom appropriate treatment has not bettered these inflammatory conditions. Hegar believes that an abdominal operation is always indicated, as opposed to a vaginal operation; for only by the former can the operator see the full extent of the disease and remove the tumors without tearing and crushing them or squeezing out their contents.

Westphal,¹ after making a series of clinical observations, decides that none of the theories advanced to account for the curative effect of celiotomy in peritoneal tuberculosis are entirely satisfactory. The removal of bacilli or of exudates, diminution of the intraabdominal pressure with secondary hyperemia, emptying of lymph-channels—these play only a minor part in the healing process. It does not seem credible that diseased conditions which have existed for months or years can be favorably influenced by changes which are necessarily only transient. The writer believes that, aside from all these, the main factor is doubtless the free admission of the external air to the peritoneal cavity, which in some unexplained way, under favorable conditions, effects a cure. Gatti² concludes that the cure does not depend on inflammatory reaction and an active growth of connective tissue, but on the fact that the epithelioid cells are destroyed by a slow dropsical degeneration and then absorbed, the round-cells and the bacilli gradually disappearing at the same time, so that finally only the preexisting connective-tissue stroma with its vessels remains. Abdominal section sets up conditions that either destroy or enfeeble the tubercle-bacilli, in either case hindering their further multiplication. The proteins of the bacilli that have been killed or damaged by the operation then induce a slow degeneration of the epithelioid cells, and this underlies the histologic retrogression of the tubercle.

The Prevention of Impregnation by Division of the Fallopian Tubes.—Kehrer³ insists upon the importance of preventing patients with certain chronic and wasting diseases from becoming pregnant. This may also be desirable in cases of extreme pelvic contraction. It would seem more rational under these conditions to render such women sterile, than to resort to the inevitable alternative of artificial abortion after pregnancy has occurred. None of the ordinary preventives is absolutely certain—at least, in the hands of the laity. Since removal of the adnexa is followed by climacteric disturbances, the writer suggests that a woman may be rendered sterile by simply dividing and ligating the tubes, as is practised by some operators during the performance of Cesarean section. From experiments on rabbits he found that this procedure was not followed by either hydrosalpinx or pyosalpinx, as might have been inferred. The usual anterior vaginal incision is made, as in vaginofixation, the fundus uteri is drawn down into the wound, and each tube is ligated in two places near the isthmus, and divided between the ligatures, care being taken not to include the vessels. The uterus is sutured in a position of ante-flexion. The advantages claimed for this method are simplicity and the absence of subsequent disturbances, especially atrophy of the genitals and the extinction of sexual desire. Should the adnexa be diseased, they are, of course, removed. The writer adds that this operation should only be performed as a last resort, at the request of the family physician, as well as of the husband and wife. In order to avoid subsequent complications, the written consent of the parties interested should be obtained.

Beuttner⁴ suggests the following method: The abdomen is opened by a transverse incision just above the symphysis. The Fallopian tubes are divided

¹ *Centralbl. f. Gynäk.*, No. 41, 1897.

³ *Ibid.*, No. 31, 1897.

² *Ibid.*, June 12, 1897.

⁴ *Ibid.*, No. 40, 1897.

as far as possible from the uterus, and the 4 ends are closed with separate sutures, including the muscle and peritoneum. The divided ends are reunited by circular serous sutures (as in circular enterorrhaphy) so that a double septum is formed, while the tube retains its normal position.

Fritsch¹ thinks that in some cases it may be desirable to prevent future conception after performing vaginofixation in the case of a woman who already has children, considering the risks of pregnancy. Kehrer's method then offers advantages. The writer reports a case in which he first resected portions of both tubes and then performed vaginofixation. Ligation is not sufficient, as he once tied both tubes with silk, yet the patient had a child 3 years later.

Kossman² relates some early experiments on young hens, to show that simple ligation of the tubes is insufficient to ensure sterility. The oviduct was tied with silk; but 6 weeks later the hens began to lay. Postmortem examination showed that the silk ligatures had become encrusted with calcareous matter and were then broken by the swelling oviduct. The two halves of the broken rings were found in the peritoneal cavity. He goes on to remark that ligation of the tube followed by division may be ineffective, if the division be made with knife or scissors, for the union of the cut edges of the two halves with the surrounding peritoneum may lead to the formation of a little sac which serves as a communication. The same result may follow the removal of a piece of tube by a clean incision; and even the sewing up of the cut ends is uncertain, for the cutting through of a stitch may vitiate the operation. The writer holds that the only certain method is excision of part of the mucous membrane of the tube or its destruction by means of the thermocautery.

Rühl³ points out the uselessness of the plan of resection of the Fallopian tubes with ligation of the stumps for the prevention of conception, as proposed by Kehrer. Not only does it not prevent conception, but it exposes the female to all the dangers of extrauterine gestation; for in one case in which he removed the ovaries and ligated with silk the uterine ends of the two tubes, and for greater security covered them with peritoneal flaps, he found some months later, on performing a hysterectomy, that the stump of the right tube was not adherent, but communicated by a free opening with the abdominal cavity. In order to destroy the power of conception, therefore, he thinks it better, after partial resection of the tubes, to debouch the two ends of the uterine portions into the vagina, through an incision in its anterior wall. This method he has recently practised, and will report results later. [In this country we do not think it will much matter which ultimately proves the better operation for the purpose, for such serious measures as robbing a woman for all time of her natural powers, an irreparable loss which she may hereafter as bitterly bemoan as at the time she may ardently desire it, will scarcely commend themselves as justifiable. In cases of pelvic deformity or other organic condition which would render delivery impossible, which alone might render the operation justifiable, perhaps, the danger of Cesarean section would be no greater, should the woman ever become pregnant, than that of the operation for preventing conception. She should therefore wait to take the risk till it is really demanded.]

The Treatment of Pelvic Disease.—According to Mundé,⁴ the treatment of acute salpingitis consists mainly in very copious hot vaginal douches, with or without the addition of some medicinal agent (carbolic acid, boroglycerid), warm sitz-baths, rest in bed, with hot abdominal fomentations. In

¹ *Centralbl. f. Gynäk.*, No. 40, 1897.

² *Ibid.*, Apr. 9, 1898.

³ *Ibid.*, No. 8, p. 211, 1898; *Gaz. hebdom. de Méd. et de Chir.*, May 22, 1898.

⁴ *Med. Brief*, June, 1897.

chronic catarrhal salpingitis local vaginal treatment may be of service, as painting the vault with tincture of iodine and glycerin, equal parts, or the introduction of a 15% ichthyol-and-glycerin tampon, followed by hot, copious vaginal douches. Except at the menstrual period, this treatment is to be continued for from 3 to 6 months. Mild local galvanism, with the positive pole in the vagina, may relieve the pain. If this course of treatment fails, removal of the diseased tubes will become necessary. A tube which has been more or less occluded or distorted, and the abdominal opening of which is closed by adhesions, is practically beyond our power to restore to a healthy condition. Tubes distended with pus should always be operated upon, removed if possible through an abdominal incision, or opened and drained through the vaginal vault, if adherent. The dangers of operation are not very great.

Abdominal Section.—*Statistics.*—Rein,¹ at the meeting on April 25, 1896, of the Kiev Obstetric and Gynecologic Society, reported the celiotomy-statistics of his own clinic and those of many other European operators as follows: Of 332 oöphorectomies and removal of cysts of the broad ligament, 3% died; of 73 fibroid tumors, 10.9% died; and of 39 other celiotomies for various causes, 38.4% died. From 1883 to 1888, of 139 celiotomies, 15.1% died; from 1888 to 1896, of 361 celiotomies, 6.4% died. Snegirew reports 567 celiotomies, with a mortality of 9.3%; oöphorectomies, 7.4%; fibroid tumors, 12.3%; Kossinsky, 412 celiotomies, oöphorectomies, 18%; fibroid tumors, 24%; Phenomenow, 234, 7.5%; Ott, 204, 11.4%; Lebedew, 200, 3.5%; Bogaewsky, 150, 3.5%; Lawson Tait, first 1000, 9.2%; Lawson Tait, second 1000, 5.3%; Leopold, 1000, 13.3%; Schauta, 1000, 10.4%; Olshausen, 459 oöphorectomies, 10.1%; fibroid tumors, 22%; Leveriano and Codreano, 34%.

Technic.—C. E. Cooper² emphasizes the importance of the preparation of the skin in the prevention of suture-abscesses. The method generally used is to give a general bath, followed by scrubbing the field of operation with hot lysol (2%) solution, and binding on a cotton compress wet with 1:1000 watery solution of sublimate. This, he claims, does not suffice, and he prefers a 1:1000 solution of sublimate in sterilized olive-oil or lanolin, which thoroughly penetrates the skin. Gauze soaked in the same preparation should be bound on overnight. W. J. S. McKay,³ for the pedicles, always uses floss-silk; while for ligatures and for sewing up the abdominal wound he uses braided silk. He has given up the use of silk-gut, because it breaks at the most inconvenient times, and also on account of the difficulty of tying it. He never boils silk, but prefers to place it in moderately hot water, which is changed every half-hour for 7 or 8 hours. The silk has by these means all the grease dissolved from it and does not become brittle. He then soaks it in a solution of 5% carbolic acid in water for 12 hours, dries it, and keeps it dry in bottles. II. Fritsch⁴ remarks that if union by first intention is desired, it is necessary to carry out the following rules: 1. The preparation of the patient should be made in a most careful manner. A bath should be given, and should last at least half an hour, and a kilogram of sodium carbonate should be added to the water. Before the bath the abdomen and the genitals should be carefully soaped. Twelve hours before the operation a permanent compress saturated with a nonirritating antiseptic solution, designed to soften the epithelial layer, should be applied to the abdomen. Immediately before the operation the skin should be scrubbed with potash-soap, and after that is washed off the skin should be scraped with a razor; this being done, lavage should again be prac-

¹ Centralbl. f. Gynäk., No. 18, 1897.

³ Intercol. Med. Jour. Austral., Dec. 20, 1897.

² Pacific Med. Jour., July, 1897.

⁴ Deutsch. med. Woch., Oct. 21, 1897.

tised with an alcoholic solution of soap, and then with a 1 : 1000 solution of corrosive sublimate. 2. The lips of the wound should never be separated with the fingers, but an abdominal speculum with smooth sides should be used. The fingers injure and tear the adipose lobules, and in this way favor gangrene of the injured parts. 3. Before suturing, all strips and fragments of cellular adipose tissue should be cut with Cooper's scissors. In case of a septic operation, when pus is discharged over the edges of the incision, after suturing the peritoneum the superficial layer of the two lips of the wound should be completely excised. 4. The suture should always be made with a double thread passed from within outward; for otherwise the needle, passing through the skin, may bring into the subcutaneous tissue staphylococci which are found deep in the glands of the skin and cannot be reached by antiseptics.

Intravaginal Pressure as an Aid in Abdominal Operations.—Nungebauer¹ conceived the idea of assisting the removal of intrapelvic neoplasms by elevating the pelvic contents by pressure exerted through the vagina by means of a colpeurynter. Before operating upon a case of extra-uterine pregnancy he introduced the rubber bag and distended it with water to its utmost limit. On opening the abdomen he was surprised to find that the tumor, which was previously situated deeply within the pelvis, now appeared immediately beneath the wound and was easily removed. As the colpeurynter was emptied the pelvic organs sank to their normal position.

Sterilization of Catgut.—A. Goldspohn² prefers the preparation of catgut by formalin for the following reasons: First, because it stands the crucial culture-tests that have been applied to it by its founders, which is not true of any other method, that of von Bergmann not excepted, for Braatz cultivated anthrax-spores of only moderate resistance in abundance in catgut prepared by that method. Secondly, because of the immense satisfaction to the surgeon, derived from a knowledge of the supreme germicidal capacity of water boiling for 20 minutes. Thirdly, because this catgut is hardened enough to answer the purposes of chromicized catgut reasonably well, without being too hard. From clinical observations, his impression is that the smaller sizes hold for from 7 to 10 days; while the larger sizes, as No. 6, used on pedicles, etc., hold for about 14 days. The procedure which he has adopted is that of Hoffmeister, with some modifications. The important features in the technic of this procedure are: (1) Winding the gut, one size on each spool, not too closely and in a single layer, with as much tension as possible, on sections of heavy glass tubing, about 1 in. in diameter and 4 to 5 in. in length, with fused edges. Each end of the gut, whether of one piece or of several tied together, is tied to a strong double sewing-thread, and is securely fixed by being wound under a sufficient number of turns of this thread near the ends of the glass bobbin, to prevent it from shrinking and swelling in the watery menstruum, in which it undergoes very great tension. (2) The spools are then placed in a 4% solution of formalin (1½% formaldehyd) for 48 hours, or they may be treated by formaldehyd gas, dry, for about the same length of time, in a tightly closed receptacle containing a generating-lamp burning wood-alcohol. (3) From the formalin solution the spools of gut are next transferred directly, without much exposure to the drying effect of air, into another jar, which is placed under a hydrant, to whose faucet a rubber tube is attached that reaches to the bottom of this jar. A current of water is thus secured from the bottom of the jar upward, which washes out during 24 hours the excess of formalin in the gut. (4) The deformed spools are next placed in a steril-

¹ Centralbl. f. Gynäk., No. 5, 1898.

² Va. Med. Semi-monthly, Dec. 10, 1897.

ized jar containing a solution of pyoktanin (methylene-blue) in sterilized water, 1 : 1000, in which they are boiled for 20 minutes over a water-bath. Over the same water-bath, or other vessel, as many wide-mouthed pint bottles, with ground-glass stoppers, as there are different sizes of gut to be used, are also boiled, together with several long forceps, with which to do all future handling. (5) At the expiration of 20 minutes of ebullition in the catgut-jar the spools are taken out; *they are never touched by the fingers of any one whatsoever*, but are handled with the sterilized forceps; the excess of free pyoktanin is rinsed off in sterilized water, and then each spool is placed alone in one of the sterilized glass-stoppered dispensing-bottles, and there preserved in commercial alcohol, drawn directly from the barrel, without any intervening bottles or graduates. (6) These dispensing-bottles are kept wrapped singly in sterilized towels, and placed together in a clean case, with a cover that fits well and can be readily lifted off. During an operation those bottles that contain, each, one of the respective sizes of gut to be used, are taken out of the case, rinsed in bichlorid solution, and placed in a sterilized basin about 10 or 12 in. in diameter. The glass stoppers are then temporarily removed and the mouth of each bottle is stoppered with a wad of sterilized dry gauze, alongside of which the end of the catgut thread is kept projecting and can be drawn out rapidly, in any desired length, without displacing anything, because it unwinds very readily from the section of glass tubing, which in itself forms an ample counterweight. Over all a sterilized towel is spread during intervals between successive operations or pauses in the same operation. Thus, only a few inches of gut ever leave the preserving liquid, that are not used, and are cut off finally when the glass stopper is returned to each bottle, and absolutely no gut that is not used need ever be handled by any one.

Drainage.—Burrage¹ has of late employed the postural method of draining the peritoneal cavity, after abdominal operations, described by Clark in the *Johns Hopkins Hospital Bulletin* for April, 1897. This method consists in flushing the peritoneal cavity with sterile salt solution, wiping it dry with gauze, and then introducing from one to two pints of sterile salt solution. The abdomen is then closed and the foot of the bed raised 18 in., thus favoring a flow of fluid from the pelvis to the diaphragm, where absorption of liquids contained in this great lymph-sac proceeds with the greatest rapidity. By the use of this method it is possible in many cases to close the abdomen under circumstances in which drainage is usually considered necessary. The 27 patients which Burrage mentions as having been treated by this method all recovered, although in this respect the new treatment did not differ much in result from that previously used in the same hospital in 167 celiotomies performed during the last 18 months, in only 1 of which was there a fatal termination. In the new method it is well to keep the foot of the bed elevated at least 36 hours. The salt solution increases the amount of urine and diminishes thirst. Vomiting is facilitated by elevation of the foot of the bed. Swallowing is rendered more difficult, but is still easily possible if slowly performed. There is less nausea and less abdominal distention and pain.

After-treatment of Abdominal Section.—Mangin and Raynaud² report several cases of septic disease of the adnexa in which subcutaneous injections of saline solutions were administered before and soon after operation, in quantities varying from 200 to 500 gm. Their conclusions are thus stated: Injections of artificial serum possess great value in cases of general septic infection, especially at the onset of the disease. The circulation is regulated, the heart-action increased, and the cerebrospinal system and nutritive functions

¹ Ann. of Gyn. and Pediat., Jan., 1898.

² La Gynéc., Oct. 15, 1897.

are stimulated. Diuresis is increased within a few hours, but no appreciable amount of toxic matter is eliminated. The improvement in the general condition is to be ascribed to dilution of the toxins in the blood, which are thus rendered less noxious to the cells. This process of dilution should be continued, as long as fresh toxins develop, by the gradual injection of moderate quantities of saline solution. Artificial serum exercises a most favorable action upon anemic and asthenic patients, who are exhausted by a long illness or severe operation, and also prevents shock, if injected *before* such an operation. The ease and safety of the subcutaneous method, and the fact that it may be practised by the inexperienced, commend its general use. Intravenous injections should be reserved for cases in which a very rapid action is necessary, as in profuse hemorrhage, or in desperate cases, where subcutaneous absorption is poor because of the depressed condition of the patient.

Complications During and After Abdominal Section.—1.

Shock.—[Although the pathology of shock is still a debatable question, the treatment has been perfected until the results now obtained are very satisfactory both to patient and to operator. The different theories regarding the pathology have undergone some criticism and experimental inquiry during the past year, especially by two American investigators, Eugene Boise and George W. Crile. The latter's researches formed the essay to which was awarded the Cortwright Prize Fund of the College of Physicians and Surgeons of New York for 1897. The former, in several papers, has formulated a theory which appears to answer all the symptoms generally met with in shock following and during surgical operations.

Boise, in contributions to the *Transactions of the American Association of Obstetricians and Gynecologists*, has attacked the old theories of paresis of the sympathetic system, paresis of the splanchnics, paresis of the cardiac and respiratory ganglia, and paresis of the circulatory system, and has erected upon the ruins of these erstwhile theories another, which in many respects is worthy of more confidence and belief. To him, nearly all the symptoms of shock can be explained on the theory that a *hyperirritation* of the entire sympathetic system is present, and as a result we have stimulation of the vasomotors, contraction of the arterioles, and a spasmodic action of the heart. The condition of the skin, pupils, heart's action, feeble pulse, scanty secretion of urine, and the like, can all be easily explained on the theory of sympathetic stimulation, and when the therapeutic measures in vogue seem to meet the indications present the theory gains thereby in strength. Thus amyl nitrite, nitroglycerin, morphin, and moist heat are regarded as sedatives to the sympathetic system and relaxants of the arterioles, and produce most favorable results.

Crile has experimented more with the blood-pressure as affected by manipulation and irritation of the various organs and tissues of the body, and favors the treatment by intravenous injections of warm saline solutions along with a dilute solution of strychnin slowly injected into the rubber tube of the infusion-apparatus, thus entering the circulation directly in the stream, instead of injecting it into the patient.]

C. H. Whiteford¹ says that shock by no means satisfactorily accounts for the collapse which may follow the simplest laparotomy. He regards the loss of fluid resulting in failure of the circulation as the prime factor. To correct this he would fill the peritoneum with hot sterilized salt solution or other watery solution; stimulants, in the form of brandy and strychnin, well diluted, may also be given by intravenous injection. H. G. Wetherill² regards

¹ Lancet, Apr. 9, 1898.

² Jour. Am. Med. Assoc., Mar. 12, 1898.

surgical shock, with or without hemorrhage, as primarily conservative in its tendencies. The incident prevention of rapid exhaustion, of acute suffering, or great blood-loss when the blood-vessels are opened, all tend to the ultimate saving of life. Premature stimulation in the treatment of traumatic asthenia may defeat this conservative effort of nature. Bleeding should be stopped and proper provision made for the comfort and welfare of the patient before strong stimulation is resorted to, unless there is imminent danger of death.

2. **Ileus.**—A. H. Tuttle¹ believes that the division of ileus into the varieties *dynamic* and *adynamic* is valuable, since according to its cause will its treatment be determined. In *adynamic* forms 3 principal conditions exist before operation. Single or combined low-grade inflammatory or catarrhal conditions of the gastrointestinal tract, old peritoneal adhesions and complications that interfere with peristalsis, and nervous exhaustion of the bowels of severe type, which forms a part of the condition of a general neurasthenia. The *dynamic* form finds its origin in septic and aseptic causes. The septic causes are of external and internal or automatic origin. The aseptic variety is due to the absorption of a large amount of dead albuminous substance which is formed along the lines of incision and dissection and in free portions of tissue that are strangulated in the process of ligating vessels, either singly or *en masse*, and to the effects of blood in the peritoneal or subperitoneal spaces.

Engström² says that paralysis of the intestines which follows laparotomy, sometimes producing death, does not always result from sepsis. He cites 4 cases in which death followed operation after 57 hours, 7, 8, and 10 days respectively. In these 4 cases there was not the least trace of peritonitis, which there would certainly have been if death had been due to sepsis after such an interval of time. Moreover, in one case the contents of the abdominal cavity were examined bacteriologically one hour after death, and were found absolutely sterile. According to the author, careful stimulation and nutrition of the patient, if necessary, per rectum, are most important factors in preserving life. Blume³ says that *dynamic* ileus following operations must be regarded as a surgical disease; and surgical treatment, in order to be successful, must be instituted before the vital forces of the patient are exhausted. The ordinary means—cathartics, enemata, and stomach-washing—have been faithfully tried, and have utterly failed to give relief. The nature of the obstruction has led to the suggestion of antispasmodics. As nothing is known about the condition of the contracted portion of the bowel after operation, it is questionable whether a simple incision of the intestine will save the patient. As an emergency-operation, a portion of the distended bowel should be sutured to the abdominal wound, incised, and the intestinal contents removed. If necessary, a secondary operation may be done later.

3. **Hernia.**—Kouwer⁴ insists on dividing the parietes accurately along the linea alba, carefully avoiding the sheaths of the recti, which, he says, must not be opened. The sheaths, after the operation, are united with a continuous silk suture; the integuments are closed separately in two layers. Kouwer's aim is to avoid constriction of muscular tissue, which would lead to its atrophy and consequent weakening of the scar. He also likes to ensure the accurate union of each layer along the line of its sutured wound, and to avoid the adhesion of muscle to sheath or sheath to skin. If there be any objection to leaving sutures in the tissues, Kouwer recommends interrupted

¹ Ann. of Gyn. and Pediat., May, 1898.

³ Buffalo Med. Jour., Oct., 1897.

² Centralbl. f. Gynäk., Sept. 11, 1897.

⁴ Centralbl. f. Gynäk., No. 49, 1897.

figure-of-8 sutures, the deeper loop holding the aponeurosis together, the more superficial closing the skin-wound. In order to restore tone to the abdominal muscles, he recommends massage and faradization. Treub believes in a single set of interrupted sutures. He exhibited a preparation of the parts around an abdominal wound closed after this method. The patient recovered, but died later from return of the malignant disease for which the operation had been performed. Union of layer to layer was perfect, and there were no signs of atrophy of the muscle or other tissues from pressure.

A. F. Currier¹ has observed 3 varieties of hernia after abdominal operations: the simple, the multiple, and the massive. The treatment varies with the form.

La Torre,² in a very extensive paper upon this subject, aided by experimentation upon 25 dogs, determines that hernia after celiotomy is chiefly due to the defective union of the musculoaponeurotic layer or relaxation of the cicatrix, conditions which lead to the union of this layer by second intention, circumstances which relax, tear, and predispose to relaxation of the cicatrix. A good closure of the abdomen results from 3 principal factors—the tissues divided and sutured, the suture-material, and the method of applying it. The suturing of the aponeurotic tissue of the linea alba is often the cause of hernia, which does not occur if the incision is through the muscle. The incision should be made through the linea alba, and before closing it the aponeurotic tissue should be removed as far as the muscular substance of the recti, and the sheaths and muscles sutured. In old or sterile women the layer-suture of the linea alba may be employed if the conditions necessary for a firm cicatrization can be gained during and after operation; but as that is almost impossible, the incision may be made through the rectus muscle. He removes the linea alba in all cases before closing the abdomen. In cases of secondary closure the incision and suture should always be in the substance of the muscle. Silk and catgut are the preferable suture-materials. The layer-suture is best, uniting separately the peritoneum if possible, the posterior layer of the sheath of the rectus muscle, the rectus muscle, the anterior layer of the rectus-muscle sheath, the skin, and subcutaneous tissue. Every effort should be made to obtain primary union.

Secondary Celiotomy.—Noltschini³ concludes a paper on this subject, based on 4160 cases, as follows: 1. Secondary celiotomy is usually performed for ileus, hemorrhage, obstruction of the ureters, or general peritonitis. 2. The true cause of the formation of adhesions has not been satisfactorily explained, and this complication is none the less frequent since aseptic has been substituted for antiseptic technic. 3. The indications to reopen the abdomen in cases of peritonitis are not clearly defined. 4. Celiotomy is indicated in ileus, though the mortality is high (38.5%). 5. The time which intervenes between the first appearance of symptoms of obstruction and surgical interference should have no direct influence. 6. Emaciation, collapse, and intestinal paralysis may serve as contraindications. 7. While peritonitis, hemorrhage from the slipping of ligatures, and obstruction of the ureters have become rare, through improvements in technic, there still remain a considerable number of cases of ileus. 8. The prophylaxis of intestinal obstruction depends upon two points—the avoidance of free purgation before operation, which tends to weaken the muscular coat of the gut and cause paralysis, and the prevention of mechanical and chemical irritation of the peritoneum during operation.

¹ Ann. of Gyn. and Pediat., July, 1897.

² La Gynéc., Apr., 1897.

³ Ibid., Oct., 1897.

Hysterectomy for Suppurative Disease of the Pelvic Organs.—

Jonnesco¹ strongly advises complete removal of the uterus and appendages by abdominal section in cases of suppurative disease of the appendages. He has operated in 14 cases, losing only 2; in 1 the suppuration had extended far into the pelvic connective tissue, and in 1 a coil of intestine was accidentally transfixed by an abdominal suture. He maintains that this operation is more surgical than vaginal hysterectomy for the same purpose. The whole structure, uterus and appendages, are taken away at once, so that there is no danger from the opening of suppurating tubes. This process at the same time ensures ligation of the uterine and ovarian vessels. No forceps or ligatures are applied in the dark. The peritoneum is sewn over the raw parametrium and the stumps of the ligated vessels. The patient being placed in Trendelenburg's position, the precise extent of the disease can be seen and the operation conducted in a good light, and manipulations are far easier than when the parts are removed through the vagina. Being thorough in its character, recovery is complete, and adjacent structures, such as the ureters, bladder, and rectum, escape injury. As the uterus is not large in suppurative affections, the difficulties in avoiding those structures, so frequent in fibroids involving the broad ligaments, do not exist.

Hysterectomy in Puerperal Sepsis.—Vineberg² remarks that if this question is perplexing at times, even after we have opened the abdomen and removed the uterus and appendages, how much more difficult must be its solution when we have to depend solely upon the clinical phenomena present? The voluminous literature upon the subject, with the comparatively recent additional knowledge acquired through bacteriology, does not help us so materially when we are brought face to face with a given case of puerperal infection. Each case must be carefully watched and studied; our line of action must be prompt, and while it should be based upon well-grounded conservative principles, it should not be characterized by a hesitancy and lack of courage that postpones heroic measures until the patient is moribund. The pulse is the guide to operation. If, in spite of curettage, frequent irrigations, and approved general treatment, the pulse should go above 130 and grow small and weak, the gross source of the infection should be removed by extirpating the uterus. The condition of the abdomen should also be noted. As soon as there are signs that the disease is extending to the general peritoneum, no time should be lost in resorting to hysterectomy.

Conservation of the Ovaries.—[An important question has been largely discussed during the year—namely, Shall we or shall we not retain the ovaries in part or wholly in operations upon the uterus and its appendages? The conservative tendency of the day answers in the affirmative, and the general trend of opinion is that this is the proper procedure to adopt.] A. Palmer Dudley³ states, "My reasons for having devoted myself to such work are: That I believe no surgeon can anticipate just what effect an early induction of the menopause by ovariectomy will have upon a woman's nervous system. Some it will affect in one way, some in another; some will put on flesh, some will lose it; some will be cheerful and contented, others will be melancholy. In many cases the domestic relations are destroyed by the knowledge of the husband or wife that she is not a perfect woman, and that what every woman should have preserved, if possible, she has been deprived of. Patients all suffer more or less from hot flushes, and in many cases the latter become a very troublesome condition, the heart-palpitation and hot flush creating a constant fear of future evil. Many times in the past I have had patients return

¹ Proc. Internat. Med. Congress, Moscow, 1897.

² N. Y. Med. Jour., Apr. 2, 1898.

³ Am. Jour. Obst., Jan., 1898.

to me and complain that these nervous symptoms were dreaded much more than the condition for which I did the operation, and express a regret that they had ever undergone the same. Another reason for my work is a belief that pelvic surgery should not be compassed about by the opinion, even of a majority of the profession, that hysterectomy is the last resort in order to effect a cure. We must progress, if possible; for the design of surgery from the beginning was to save and not to mutilate the human body. This should be constantly borne in mind by every fair-minded surgeon; and I predict that if any advance is made during the next ten years, it will be along this line of conservative surgery upon the appendages."

H. A. Kelly¹ laments the change of name of the essential female organs of sex from "*testes muliebres*" of the older anatomists, to "*ovaria*" or "*ovaries*" of present writers, and so the losing sight of the homology between these glandular organs in the male and female. Had the older proper name of the ovaries been preserved, and were they to-day called "*testes*," radical surgery would have advanced far more slowly and would never have gone so far, as the well-known conservatism with which the male is treated would then inevitably have been reflected upon the gynecologic field. We are now beginning to realize that so long as the cyclic changes of menstruation persist, they hold most important fundamental relations to the well-being of the body at large, and we know only too well that the sudden artificial induction of the menopause is often the source of extreme and lasting discomfort. "It is probable that the ovaries, like the liver and thyroid gland, modify the blood circulating through them, and add to the blood some peculiar product of their metabolism. It may be that some of the climacteric symptoms are due to the loss of this substance from the system." "*Spermin*," an active principle found in the sperm, and also in the thyroid, spleen, testes, blood, and ovaries, is an active oxidizing agent and increases the nitrogenous excreta of the kidneys. Experiments show that extirpation of the ovaries causes a marked decrease of the phosphates in the urine, due to diminished oxidation of the organic phosphates contained in the tissues, which are finally deposited in the bones in the form of calcium and magnesium phosphates; while removal of one ovary causes marked compensatory hypertrophy of the other. The author, believing in the advantages of leaving the ovaries in place, even when the uterus and tubes were entirely removed, has so conducted his late operations and met with most satisfactory results. The severe discomforts so often experienced after artificial induction of the menopause were almost entirely absent and the general condition of the patient greatly improved.

B. Sherwood Dunn² remarks that statistics show functional troubles to be more constant and intense in women who have lost both ovaries by operative interference. There is little, if any, modification of these disturbances when the uterus is left in place and both ovaries removed; while they are notably less when the uterus is removed and the ovaries left *in situ*. M. D. Mann³ has for a long time preserved as much of the ovary as possible, and has in 100 cases practised conservative surgery of the ovary.

Vaginal Incision for Pelvic Disease.—The legitimate scope of vaginal section is summarized by A. Brothers⁴ as follows: 1. For exploratory purposes; examining the adnexa; breaking up adhesions behind the uterus preparatory to fixation-operations; separating similar adhesions about the adnexa. 2. In cases in which simple oöphorectomy is indicated. 3. In cases of small accessible fibroids; hysterectomy or morecellation can easily be supple-

¹ Brit. Med. Jour., Jan. 29, 1898.

³ Ann. of Gyn. and Pediat., Mar., 1898.

² Clinical Reporter, Sept., 1897.

⁴ Am. Gyn. and Obst. Jour., June, 1897.

mented when necessary. 4. In cases in which it is deemed desirable to shorten or attach the round ligaments beginning at their uterine insertions, or to do a vesicouterine fixation. 5. In cases requiring incision and drainage for pelvic abscess, pus-tube with adhesions, hydrosalpinx, and pelvic hemocele. 6. In a cystic condition of the tubes and ovaries, when small and not firmly bound down by adhesions. 7. In cases of chronic salpingoöphoritis with atrophied ovaries and thickened tubes. 8. In cases in which "conservative surgery" of the adnexa is desirable.

Coe¹ prefers explorative vaginal section: 1. In all cases in which the presence of pus within the pelvis is suspected, as in pyosalpinx, pelvic abscess proper, suppurating dermoids and cystoadenomata, and hemocele. 2. In the case of small intrapelvic tumors situated in the pouch of Douglas, or at least readily accessible from below. Impacted ovarian cysts, dermoids, and fibroids belong to this category. 3. Adherent adnexa situated in the true pelvis. 4. Unruptured ectopic sacs in the same locality. 5. Circumscribed exudates and indurations in the broad ligaments or behind the uterus, especially when associated with displacement and fixation of the latter organ.

Cragin² says that in his hands the vaginal operation has proved of great service in cases of pregnancy in which the parturient canal was obstructed by tumors. In 3 cases of this kind the operation has enabled him to deliver a living child. According to his experience, the vaginal operation has proved a great boon in three groups of cases—viz.: (1) Pus-cases, in which the removal of the uterus and appendages is indicated; (2) cases in which the exudate indicates the necessity for drainage without removal of the organ; and (3) small fibromyomata.

E. Rics³ says the vaginal operation is indicated in operations on the uterus, in vaginofixation in its various forms, and in removal of fibroids; operations on the ligaments, or shortening the round, sacrouterine, and ovarian ligaments; operations on the tubes, or salpingectomy, salpingostomy, salpingohysteranastomosis, and sterilization by incising and ligating the tubes; and operations on the ovaries, or castration, ovariectomy, resection of the ovary, and operations for prolapse of the ovaries. R. Peterson⁴ says that the incision in the posterior cul-de-sac should be wide, even greater than that commonly employed in vaginal hysterectomy for nonsuppurative disease. The task may be very easy or exceedingly difficult, according to the position of the abscess-cavity and the density of the adhesions. The after-history of these cases is remarkably good. They not only regain their health, but bimanual examination will reveal but little pelvic sensitiveness and thickening. A. H. Goelet⁵ says that vaginal section is applicable in the following conditions: In ovarian cysts of considerable size, since the fluid can be evacuated and the sac withdrawn through a small vaginal incision; for pyosalpinx, hydrosalpinx, and hematosalpinx; for the removal of small subperitoneal fibroids by myomectomy; for drainage of pus-accumulations situated low down in the pelvis; for hematoma and hemocele, including ectopic gestation; for pelvic exudations which resist other means for their removal.

E. N. Liell⁶ remarks that the adoption of the Trendelenburg position in operating by the vagina has facilitated and rendered possible results in cases in which otherwise such would not have been. C. Cleveland⁷ says that in pelvic abscess, when it has been decided to perforate and drain through the

¹ Charlotte Med. Jour., Feb., 1898.

³ Chicago Med. Recorder, Dec., 1897.

⁶ Va. Med. Semi-monthly, July 9, 1897.

² Ibid.

⁴ Physician and Surgeon, Jan., 1898.

⁵ Med. Rec., June 25, 1898.

⁷ Ibid., Apr. 23, 1898.

vagina, it is safer to perforate directly through the vaginal vault than first to make posterior section. He claims that the abdomen should seldom be opened for pus-tubes. It is as possible to do clean surgery by the vagina as it is by the abdominal route. F. Henriotin¹ has made 125 vaginal sections without exsection. Fully 100 of these were for incipient pelvic sepsis or acute exacerbations of an old disease, and yet he has had no deaths.

DISEASES OF THE OVARIES.

Structure of the Ovaries in Osteomalacia.—E. Ferroni² has had an opportunity of examining the ovaries in 2 cases of osteomalacia, under the care of Mangiagalli. In one case the ovaries alone were removed, and in the other Porro's operation was performed (uteroovarian amputation). To the naked eye the organs were distinctly larger than normal. Microscopically the Graafian follicles were normal, as were also the small blood-vessels in the cortex. Here and there in the cortex were small homogeneous, clear points of hyaline degeneration. In the medulla there was a noteworthy increase in the number of vessels; they were distinctly tortuous and their walls thickened, especially in the media and adventitia. Here and there dilatation of the vessels could be seen. The vascular walls showed hyaline degeneration, especially of the outer coat, but to some extent also of the middle coat. These characteristics were similar to those found in cases by Velits, Orthmann, Flatau, Heyse, and Rossier. The hyaline changes are to be regarded as secondary; the primary alterations are the circulatory alterations, the hyperemia, the development of the blood-vessels, the thickening of their walls, their ectatic condition, etc. In some measure these may be due to the pregnancy, which is complicated by the osteomalacia. In a case of rickets complicating labor, Ferroni found the same changes in the medulla of the ovaries, but in a slightly less marked degree as compared with osteomalacia.

Transplantation of the Ovaries.—E. Knauer³ communicates the results of his experiments in extirpating the ovaries aseptically and transplanting them to some other portion of the peritoneum. On killing the animals subsequently he found not only that the ovaries were grafted on to the peritoneum, but that they continued to fulfil their normal functions—viz., the development and maturation of ovules. In one case a rabbit so treated, being put to a buck 13 months after operation, became pregnant, and was delivered of a male and a female, which were in all respects normal.

Grigorieff⁴ details some interesting experiments in rabbits in which he excised the ovaries and transplanted them either to points in the broad ligaments, near the uterine cornua, or even to pockets formed in the peritoneum at distant sites. The animals were killed 6 months later, after they had become pregnant, and careful studies were made of the gross and microscopic anatomy of the pelvic organs. It was demonstrated conclusively in each case that no ovarian tissue remained at the original site of the ovary. The writer's deductions are: 1. The favorable results obtained are to be attributed largely to the rigid aseptic technic observed during the operations. 2. It is certain that the transplanted ovary continues its normal development after transplantation, and that nearly any portion of the pelvic peritoneum may be selected as its new site. 3. The follicles undergo the usual processes of development seen in the normally situated ovary. 4. Single follicles mature and rupture, and cor-

¹ Brit. Med. Jour., Oct. 23, 1897.

² Ann. di Ost. e Gin., Sept., 1897.

³ Centralbl. f. Gynäk., No. 8, p. 201, 1898; Gaz. hebdom. de Méd. et de Chir., May 22, 1898.

⁴ Centralbl. f. Gynäk., No. 22, 1897.

pora lutea are formed in a perfectly normal manner. 5. Pregnancy may occur and continue to full term after transplantation of the ovaries.

Cystomata.—H. Peters¹ considers the pathologic conditions of the female genitalia referable to the Wolffian body and duct. These he divides as follows: 1. Cysts of the parovarium. A not rare form of thin-walled intraligamentous cyst, seldom larger than a child's head, and characterized by lying close to the unchanged ovaries. The contents are usually of a thin, colorless, sometimes slightly opalescent fluid. Their growth is very slow, and they are prone to spontaneous rupture and subsequent refilling. When small they give little trouble and do not require any interference; but larger ones may require extirpation. 2. Cysts of the ligamentum latum and referable to the paroöphoron. These are usually small and thin-walled, holding a colorless limpid fluid, and are of little clinical importance, as they seldom attain a size to call for interference. 3. Cystomyomata, embracing adenomyomata of the lateral and posterior wall of the uterus and similar growths of the broad ligaments and tubes. These are of importance as producing chlorosis, dysmenorrhea, menorrhagia, sterility, inflammatory processes in the peritoneum, or vesical and peristaltic disturbances. Their prognosis is more serious than that of most myomata, and total extirpation is indicated. The author concludes that the Wolffian body and its duct play an important part in gynecology, although it is to the future we must look for a clear distinction between its domain and that of the Müllerian duct.

Zahn² has carefully examined cases of tuboovarian cyst. Like most recent observers, he finds that the large cystic dilatation which lies externally and interiorly is not part of a cystic ovary, but is the dilated ampulla of the tube, and that the orifice with structures like fimbriæ, by which the dilatation communicates with the internal, superior, and clearly tubal part of the cyst, is not the ostium of the tube, but the opening of the tubal canal into its own ostium, the plicæ projecting into the ampulla, so as to simulate fimbriæ. He admits, in fact, that in a tuboovarian cyst all the cystic portion is tubal. He distinguishes, however, a true tuboovarian cyst from a large hydrosalpinx where the ovary is concealed in the bend of the big cystic tube. In a tuboovarian cyst the ovary is actually included in the dilated ampulla. The ostium has closed over it and the ampulla has become dilated. This condition specially favors "ampullar tubal pregnancy."

Resinelli³ states that pleuritic effusions in connection with ovarian tumors are to be regarded not as an independent complication, but as a direct result of the presence of the neoplasm. The effusion develops gradually and is unaccompanied by pain or fever. The accumulation of fluid is not due to the presence of the tumor or to changes in the blood, but is really an evidence of metastasis to the pleura, less frequently of peritoneal irritation transmitted through the diaphragm. It is accordingly strong evidence of the malignant character of the tumor, provided that torsion, suppuration of the cyst, etc., can be excluded. A pleuritic effusion, instead of furnishing a contraindication to operative interference, may show the necessity of an early operation, provided that the peritoneum is not too extensively involved. In rare cases thoracotomy may be required before celiotomy is performed, though removal of the tumor is the most direct way of causing the disappearance of the pleuritic fluid.

T. Wilson⁴ calls attention to the existence of *intermittent cysts* of the ovary. The cyst in connection with which the accident most commonly happens is

¹ Indian Med. Rec., Feb. 1, 1898.

² Virchow's Archiv, vol. cli., Part 2, 1898.

³ Ann. di Ost. e Gin., No. 18, 1897.

⁴ Birmingham Med. Rev., Aug., 1897.

undoubtedly the unilocular parovarian. In the common multilocular glandular form of ovarian cyst, bursting of a loculus with escape of the contents into the peritoneal cavity is far from uncommon; but it is not proved that the fluid can be absorbed and then discharged by means of an increased secretion of urine, as in the case of the parovarian cyst. In making the diagnosis of these cysts, if the intestine be found running over the front of the tumor, it is not a cyst of the ovary unless a loop of intestine has early become adherent to the front of the cyst. If the tumor is a renal cyst, the intestine over the front is a portion of the large gut.

Intraligamentous Cysts.—R. B. Hall¹ believes that the mortality from operations for intraligamentous cysts is much higher than the statistics would lead one to believe. Many of the deaths are due to hemorrhage, either on the table or within a few hours after the patients are put to bed. He thinks the operation he proposes would save many lives, as it is practically a bloodless one. It is applicable to cases in which the adhesions are very firm and the cyst cannot easily be stripped from the pelvic floor. He describes the operation as follows: "First tap the cyst and empty it. Ligate the ovarian artery on the tumor-side at the pelvic border. Ligate the ovarian artery on the opposite side outside the healthy ovary. Divide the broad ligament. Divide the peritoneum above the top of the bladder and push the bladder down. Ligate the uterine artery on the healthy side. Cut across the cervix and clamp or ligate the uterine artery on the tumor-side. The blood-supply is then cut off and the patient has not lost a dram of blood. The capsule of the tumor can now be divided above the top of the bladder and at a suitable point behind, and the tumor enucleated from below upward with very much greater ease than from above downward, and with corresponding safety to the ureter, the rectum, and the iliac vessels. Close the peritoneum over the pelvic floor with a running suture of catgut." This method, he says, brings every part of the field of operation into view. The ureter can be seen, recognized, and pushed aside. The adhesions are separated along the line of cleavage, instead of against it, as in the old method.

C. K. Fleming² says the treatment of intraligamentous cysts by the method ordinarily employed, and advised by the various text-books on gynecology, is, to say the least, unsatisfactory. He recommends the following operation: Immediately after opening the abdomen the ovarian artery on the tumor-side is ligated in the infundibulopelvic ligament. If the cyst is a very large one, a part of its contents should be withdrawn and the puncture closed by a pair of heavy pedicle-forceps. The broad ligament on the free side is now cut between two ligatures down to a point near the internal os. The anterior flap containing the bladder must now be made, and should consist of enough peritoneum from the anterior surface of the uterus to cover the stump of the cervix. A posterior flap of peritoneum, such as is recommended, Fleming never makes, even in ordinary abdominal hysterectomies, as it simply consumes time and offers no apparent or real advantage over the single anterior flap. After completing this step the uterine artery is found and ligated in the usual way. The uterus should now be amputated above the supravaginal junction and the uterine artery either ligated or clamped. Then, after elevating the amputated body of the uterus, the first and second fingers are insinuated between the folds of the broad ligament, the cyst is rapidly enucleated from below upward, and the whole mass finally cut away. There is absolutely no bleeding, as the arteries are all under control. The final step in the operation consists in trimming the broad ligament, leaving only suf-

¹ N. Y. Med. Jour., Nov. 20, 1897.

² West. Med. Rev., Apr. 15, 1898.

ficient peritoneum to make a good flap over the denuded area. A narrow strip of sterile gauze is placed under the flap, the end of which is carried through the cervical canal into the vagina for drainage. The flap is finally held in place by a continuous catgut suture, which is also used to close in the anterior flap over the cervix. When finished the field of operation resembles very closely the appearance of the ordinary abdominal hysterectomy, save that the line of catgut sutures on the cyst-side is a trifle longer than on the other. The indications for this operation are: Large intraligamentous cysts with extensive adhesions; all intraligamentous cysts occurring in women who have passed the childbearing period; in those cases in which there is a coexisting disease of the opposite ovary or tube which demands their removal; in cases complicated by grave uterine disease.

Tuberculosis of the Ovary.—Orthmann¹ has collected 177 cases of tuberculosis of the ovary. Only 57 were carefully submitted to microscopic research; of these, 48 seemed to be instances of pure ovarian tuberculosis, bilateral in more than half (27) the cases. The remaining 9 were tuberculous ovarian cysts. In spite of theories of infection from the outer entrance of the genital tract, and notwithstanding the tendency of pathologists to make out primary disease where it has not been detected before, Orthmann declares that primary tuberculosis of the ovary has never been satisfactorily distinguished in woman, though Acconci and Schottlander have experimentally produced it in animals. In the 48 cases above noted as pure tubercle of a previously sound ovary, infection was traced from the Fallopian tube in 26, and from the peritoneum in 22. The disease may appear as tuberculous perioöphoritis, disseminated or diffused, and as miliary tubercle of the substance of the ovary (20 out of 48 cases), cheesy tubercle, or tuberculous abscess. The latter two are about equally common. The former, much more frequent, may pass undetected by the naked eye; but the disease shows its features very characteristically under the microscope. In the 48 cases, tubercle-bacilli were detected 9 times by the microscope and 4 times by experiments on animals. Orthmann describes 4 additional cases under his care. In 1 there was distinct tuberculosis of the yellow substance in a corpus luteum.

Hernia of the Ovary.—Biermer² states that as regards the etiology, in 78 reported cases the hernia was congenital in 54, being double in over one-half of these. The writer believes that the congenital anomaly is probably due to the fact that when parts of the Wolffian ducts and gubernaculum of Hunter persist the ovaries do not descend into the true pelvis, but through the abdominal wall into the labia majora, the same as the testicles in the male. If this occurs on both sides double hernia results, the genital organs being otherwise normal. In cases in which there is also an anomaly of the vagina or uterus, the cause is a defective differentiation of the sex at an early period of fetal life. In cases of acquired hernia various causes are assigned, such as undue length of the ligamentum ovarii, broad ligaments, and other peritoneal folds. Symptoms may be entirely absent. In most cases there is sensitiveness in the inguinal region, which may later become an unbearable pain. This pain is most severe a few days before menstruation, and is accompanied by increase in the size of the hernia. The pain may be of such a violent and colicky nature as to simulate incarceration. In obscure cases Schröder's recommendation is a good one: introduce a sound into the uterus, and by moving it to endeavor to move the ovary, which sign is valueless if the latter is adherent. The writer recommends removal of the affected ovary only if it cannot be reduced and becomes diseased or gives rise to severe pain.

¹ Indian Med. Rec., Nov. 1, 1897.

² Centralbl. f. Gynäk., No. 9, 1897.

PEDIATRICS.

BY LOUIS STARR, M. D., AND ALFRED HAND, JR., M. D.,

OF PHILADELPHIA.

The Year's Work.—Pediatrics, as an important branch of medicine, is receiving greater attention each year. It is difficult to single out any one department of it in which especial advance has been made; but in no other branch of medicine is the importance of hygiene or preventive medicine of greater value or recognized to a greater extent. The human organism in its early years is so susceptible to the influences of its environments that the proper regulation of these is more promising in lessening the risk of disease than in any other class of practice. Special attention has therefore been given to the management of children, both as individuals and when grouped together in schools and public places.

GENERAL CONSIDERATIONS AND HYGIENE.

That the aim of **hygiene** is to preserve a normal state as well as to erect a barrier against specific diseases has been recognized by the attention paid to what constitutes a normally healthy child. Researches in this line have been conducted by Heubner and Rubner,¹ the subject being a breast-fed infant 10 weeks old. During 9 consecutive days the whole metabolism was carefully studied. The nitrogen of the ingesta was found to exceed that of the excreta; while for carbon the reverse held, more being eliminated than was taken in. While these researches are not of special value, they indicate a very important field for further work. That general hygiene is worth the trouble has been expressed in figures by J. W. Barrett,² who has shown that the amount expended on foundlings is more than returned by the increase in the wealth of the State which they ultimately bring. In the study of the normal infant reference is made by W. Kidd,³ and in an editorial in the *Medical Age*, to L. Robinson's observations on the **survival-movements of human infancy**. These have been analyzed by a writer in *Brain*, who has grouped them in 3 classes: 1. Those of simple progression, aquatic, terrestrial, or aerial. 2. Those of prehension or arboreal existence. 3. Those of manipulation, including destruction or breaking up of food, or the search for it by digital investigation into holes and crannies. Robinson described the survival-movements of prehension, claiming that they are an evidence of evolution; but Kidd considers them to be purely reflex in origin.

School-hygiene has received considerable attention, several of the large cities now having a regular daily medical inspection of the schools. E. C. Jones⁴ refers to the statistics published by the Boston Board of Health, showing the influence of schools upon the prevalence of diphtheria. This agrees

¹ Berlin. klin. Woch., Nov. 8, 1897.

² Intercol. Med. Jour. Austral., Feb. 20, 1898.

³ Lancet, Oct. 16, 1897.

⁴ Med. and Surg. Reporter, No. 21, 1897.

with Dixey's figures for London.¹ The value of the medical inspection of schools will, of course, be especially in the lessening of contagious diseases.

W. W. Johnston² and Pauli³ have studied the **influence of school-life upon the health** of children. Johnston's conclusions are: 1. That there is a large amount of ill health among school-children. 2. That this ill health is due to a variety of diseases and disturbances of function. 3. That the same diseases and disturbances exist everywhere and are constantly present. 4. That they are aggravated by the conditions of school-life. 5. That they are increased in direct proportion to the number of hours devoted to study. 6. That they may often lead to premature withdrawal from school, and are manifest in a large proportion of those who remain to the end. Pauli arrives at similar conclusions, stating that the injurious influences are frequently found at home rather than in the school-room; and that, in general, the school-hours are too long for very young children. He thinks that there should be but one session a day, the period for study in a subject being limited to three-quarters of an hour, with a rest before the next period. The afternoon-session should be abandoned. There should be a supervision of the children during the recess-periods; and the different forms of exercise should be used under the direction of teachers. The teachers should be instructed in school-hygiene, in order that the physician and the teacher could work together. R. Faries⁴ makes a plea for the training of physicians especially in the line of the physical and hygienic care of children. An editorial writer in *Arch. of Pediatrics* for Dec., 1897, deplors the tendency of recent years to overstimulate children in educating and amusing them. He urges simple amusements for them, as the more complex overwork the mental faculties and overtax the physical powers. Articles on the general diagnosis of infantile diseases have been contributed by F. N. Shaw⁵ and by A. V. Lenton.⁶ Charpentier⁷ gives a *résumé* of the papers presented in 1897 to the Permanent Commission of the Hygiene of Childhood. France, probably more than any other country, realizes the importance of the care of children, as statistics prove clearly that there is a steady **decrease in the birth-rate in France**. For the first decade of this century the rate per 1000 inhabitants was 35; for the first half of the last decade it was 22. Pepin⁸ discussed the causes of this decrease, which are: 1. Absence of physician or midwife at the birth. 2. Inability of a great many women to nurse their children. 3. Overcrowding of the population, with improper care of the children. 4. Infanticide. 5. Certain diseases, such as meningitis, bronchopneumonia, and diphtheria, and gastrointestinal disorders. Among other papers reviewed is one by Combe on school-hygiene, which discusses the essential points of the school-building, the school-furniture, and the school-management. Another paper is that by C. E. Le Carrière and de Monfet, who have studied **the normal urine of children**. They conclude: 1. The child voids more urine than the adult. 2. The specific gravity is a little higher. 3. The acidity is much greater. 4. The nitrogenous metabolism is more active than that of the adult—that is, a kilogram of the child uses up a weight of nitrogen much more completely, the adult percentage of utilized nitrogen being 85, while that of the child is 90. 5. The mineral-nutrition shows more marked differences; the infant organism is much more strongly mineralized. 6. All the phenomena of nutrition are much more active in the child than in the adult, the maximum being between 5 and 10

¹ YEAR-BOOK for 1898, p. 610.

² Berlin. klin. Woch., Sept. 6, 1897.

³ Brooklyn Med. Jour., Oct., 1897.

⁴ Bull. de l'Acad. de Méd., Nov. 30, 1897.

⁵ Practical Med., No. 3, 1897.

⁶ Jour. Am. Med. Assoc., Oct. 23, 1897.

⁷ Med. Progress, p. 513, 1897.

⁸ Ibid.

years of age. 7. Finally the standard figures for the composition of normal urine for the adult are not applicable to children.

INFANT-FEEDING.

Chemistry of Milk.—Careano¹ states that boiled milk may be positively distinguished from raw milk by the following test: Put a few c.c. of the suspected milk in a porcelain saucer, add a few drops of fairly fresh oil of turpentine, and heat slowly. Then add to the mixture an alcoholic solution of resin guaiac. Unboiled milk is colored blue. The absence of coloration indicates that the milk has been boiled.

A Test for the Freshness of Milk.—Vaudin² has found that if a few drops of a solution of indigo-carmin are added to milk, the color produced by it gradually disappears as the action of the microbes of the milk decolorizes it. He determines the age of the milk by the duration of the tint. In fresh milk it lasts about 12 hours at 15° C., 5 hours at 15° to 20° C., and 4 hours at 20° C. When there are several decigrams of lactic acid to the quart of milk the tint vanishes almost instantly.

Dirty Methods in Dairies.—E. F. Brush³ draws an appalling but not exaggerated picture of the dangers surrounding the handling of milk in the average country dairy-farm before shipment. A perusal of his paper will go far to convince those who are disposed to ridicule the numerous elaborate details of cleanliness practised in some of the modern, scientifically conducted dairies, that it is high time that the old, dirty dairy-methods of our fathers should no longer be tolerated by an intelligent community.

Composition of Human Milk.—Alfred H. Carter and H. Droop Richmond⁴ give the results of analyses of 94 samples of human milk. The average of all the analyses gives: sp. gr., 1031.3; water, 88.04; fat, 3.07; sugar, 6.59; proteids, 1.97; and ash, 0.26. These results correspond very closely with the analyses of Lehmann and of Leeds. In comparing the results of the sugar-analyses, as obtained by polarization and gravimetrically by Fehling's solution, with the results deduced by difference, they conclude that the sugar of human milk is not lactose. There is evidence, they think, that two sugars are present, a crystalline aldobiase and an amorphous substance (animal gum?). If correction be made for the differences noted in the results obtained by polarization and by difference (the former being about 2% lower than the latter), the figures of Vernois and Becquerel come into fairly close accord with the analyses just quoted. Carter and Richmond also conclude that the proteids and ash decrease as lactation advances, and that the sugar has a tendency to increase. There is a certain amount of evidence, also, that the composition of the fat (indicated by the refractive index) differs in the earlier stages of lactation from that present later, thus offering an analogy to the fat of cow's milk, which is considerably poorer in volatile acids in the early stages of lactation than the normal fat, and shows a higher refractive index.

Pasteurization.—Koplik⁵ takes ground against the use of pasteurized milk. He quotes the experiments of Russel to show that pasteurization does not destroy the lactic-acid-forming group of bacteria, which are very active in causing gastrointestinal disturbance. The peptonizing and butyric-acid-forming bacteria are not destroyed by any process of sterilization at or below 100° C. In support of the clinical importance of this view he quotes a num-

¹ Nouveaux Remèdes, xiii., p. 335.

² Bull. de l'Acad. de Méd., Nov. 30, 1897.

³ Med. News, Feb. 12, 1898.

⁴ Brit. Med. Jour., Jan. 22, 1898.

⁵ Med. Rec., Feb. 19, 1898.

ber of cases of mild milk-infection occurring among children fed upon pasteurized milk or milk-mixtures. The symptoms of such disturbance are sometimes insidious, sometimes marked and troublesome. In some cases there will be first a looseness of the bowels: children who have had only one movement, or a constipated movement, daily, will suddenly have 5, 6, or 7 loose stools. These are at first yellow, curdled, lumpy in appearance, and distinctly acid in odor, or are admixed with green material and of intensely disagreeable odor. The infant is restless, colicky, and may or may not have a slight rise of temperature. In other cases the child will have a large number of greenish, ill-smelling movements of very acid character, and then, after a dose of castor-oil, will return to a normal condition. Others will have 1 to 3 normal stools a day; following such movements will be a large semifluid or soft stool of extremely acid reaction and distinctly penetrating sour smell. After such a movement the child feels very weak. Finally in some cases there is simply an increase in the number of stools above the usual habit of the child: they are normal in color and odor, but more fluid than they should be, and the child does not increase in weight; there may or may not be a slight evening rise in temperature. All these cases improve rapidly under a change from pasteurized to sterilized milk. Koplik believes that milk should be heated to a temperature of at least 90°, 92°, or 100° C., the latter being preferable, for 10 minutes. It should be rapidly cooled and kept below 20° C. till ready for use. In this way the peptonizing bacteria are kept inert. Koplik's observation does not bear out the objection first raised against sterilization by Leeds and Davis, that high heat lessens the digestibility of milk by coagulating and changing the albumins. This is also in accord with the conclusion reached by Bendix after a study of the waste albumins contained in the feces of these infants.

Home-modifications of Milk.—During the year several methods for the home-modification of milk have been published. The first of these was suggested by Thompson S. Westcott,¹ as a method for reducing cream-and-milk mixtures to a percentage-basis. The essential feature of this method lies in assuming a fixed average percentage of the proteids of mixed milk and cream, which is a mean between the proteid-percentages of the cream and milk used. For a mixture of 16% cream and whole milk the factor is 3.80, and for 12% cream and whole milk it is 3.90. Using the symbols P, F, and Q, for the percentages of proteids and fat, and for the total quantity of mixture, the quantity of mixed milk and cream ($M + C = x$) is found from the proportion:

$$3.80 \text{ or } 3.90 : P :: Q : x.$$

The quantity of cream to be used is then readily calculated from the formula

$$C = \frac{Q.F - 4x}{8 \text{ or } 12},$$

the denominator being 8 when 12% cream is employed, and 12 when 16% cream is to be used. The quantity of milk is then found by subtracting the value of C from the value of x . The formula for calculating the amount of milk-sugar to be added to bring the lactose-percentage up to the desired amount, S, is

$$\text{Sugar} = \frac{Q.S - 4.4x}{100}.$$

¹ Arch. of Pediatrics, Jan., Feb., 1898.

W. L. Baner¹ proposes formulæ which somewhat simplify the above calculations by assuming that the proteid-percentage of the mixed cream and milk does not differ from that of milk, and thus gains in simplicity by using the integer 4, instead of the varying decimals used by Westcott. He also uses a rather lower sugar-factor, 4. His formulæ may be derived from those already given by substituting 4 for 3.8 or 3.9, and also for 4.4. Using the same symbols, Baner gives the following:

$$C (16\%) = \frac{Q}{12} \times (F - P).$$

$$M = \frac{Q \times P}{4} - C.$$

$$\text{Sugar} = \frac{(S - P) \times Q}{100}.$$

For 20% cream the denominator of the cream-formula would be 16 instead of 12, and for 12% cream 8 would be required. In both of these methods, after the quantities of cream and milk have been determined, the rest of the total quantity of mixture is made up by the addition of water, barley-water, oatmeal-water, or other chosen diluent.

Henry L. Coit² proposes a decimal system for home-modification. Three standard solutions are ordinarily required for each modification: a decimal cream-solution (10%) for introducing the fat, a saccharated (10%) solution of skim-milk for introducing proteids not carried by the cream, and a standard sugar-solution (10%) for introducing lactose not carried by the cream and milk. During the first few months only the decimal cream and the standard sugar-solution are required for the lower proteid-percentages. For low proteid-mixtures, with middle or high fats, a decimal cream made from centrifugal (20%) cream would in some cases be required. [Of these 3 methods, either Westcott's or Baner's offers a simple means of calculating the quantities of the 2 ordinary commercial products of the dairy—milk and cream—which every mother finds ready at hand. Coit's system of standardized solutions is too elaborate, we fear, for ordinary home-modification.]

G. Woodward³ describes a method for the **clinical estimation of breast-milk proteids**. The milk is placed in burets, kept at a temperature of 95° to 100° F. for 18 to 24 hours, until curdled; the serum is then drawn off, mixed with Esbach's solution of picric and citric acids, and centrifuged until a constant reading is obtained. In 10 analyses the variation from the result obtained by the Kjeldahl method was less than 0.25%.

INFECTIOUS DISEASES.

Diphtheria.—Etiology.—The attention which has been given to the causation of diphtheria has been mainly in the line of the occurrence of epidemics. The usual doctrine of sewer-gas and the lower animals as a source of infection for human beings is now placed more in the background, and the general consensus of opinion is that the disease spreads from one human being to another. F. C. Smith⁴ discusses this phase of the subject, showing that the schools are an important factor in the dissemination of the disease. He details 2 outbreaks which were clearly the result of school-infection. This point is also shown

¹ N. Y. Med. Jour., Mar. 12, 1898.

³ Ann. of Gyn. and Pediat., May, 1898.

² Arch. of Pediatrics, May, 1898.

⁴ Lancet, Oct. 16, 1897.

by S. Murphy,¹ in a report to the London County Council. Taking 3 periods—4 weeks before vacation; the 4 vacation-weeks; and the 4 weeks after vacation—he finds a remarkable reduction in the vacation-period from the antevacation-period, followed by a still more remarkable increase in the postvacation-period. That sewer-gas does not disseminate the disease is clear from the fact that germs cannot rise from moist surfaces, and also from the fact which Smith mentions, that while the sewage-system of cities and towns has been improved and is being improved constantly, the incidence of diphtheria is increasing.

F. T. Bond² suggests a possible method for the dissemination of diphtheria in schools where the children are allotted slates for their daily use from a common supply. The children frequently lick their slates in cleaning them, and as the same slate is not necessarily given to one child constantly, a child having diphtheria-bacilli in his buccal secretions could thus easily infect a number of his fellow-scholars.

D. Riesman³ reports a case *sui generis* as regards the infection. The patient, a bacteriologist, received a **laboratory-infection** while transplanting virulent cultures of diphtheria from one flask to another while engaged in the manufacture of diphtheria-antitoxin. The pipet, sterilized in the naked flame, had not cooled when the diphtheria-culture was drawn up into it. Volatilization occurred, and the bubbles of steam forced portions of the fluid directly into the mouth. The period of incubation was between 40 and 43 hours.

W. F. Howard, Jr.,⁴ reports an **epidemic of 100 cases** in Ashtabula, Ohio, in Dec., 1896. Sixty-four of the cases appeared in 49 houses which were widely scattered. Adults were first affected. The milk-supply was suspected, and it was found that two dairies, X. and Y., supplied the people. All of the cases except two occurred in households using milk from dairy X. These two cases had each on one occasion used milk from the suspected dairy, diphtheria following within a few days. It was found that one of the helpers at the dairy, who also delivered milk, had suffered from sore throat, which became severe enough to prevent his working, at the time the epidemic broke out. At the time of Howard's investigation, however, the helper was nearly well, and no bacilli could be found in his throat nor in any part of the apparatus, nor in the milk of the dairy. W. C. Aylward⁵ observed 96 cases of diphtheria in private practice, most of the cases being mild, and the spread of the epidemic being almost entirely due to personal contact with cases of the disease. Only a few cases seemed to be the result of indirect personal infection—that is, that given by an intermediate party who escaped.

Westbrook, Wilson, McDaniel, and Adaire⁶ give a preliminary report on the **bacillus of diphtheria** and the results of their investigations in a school in which diphtheria was epidemic. A bacillus that seemed limited to the school was frequently found, and the authors consider it an atypical form of the diphtheria-bacillus. It stained uniformly, showed less variation in size, differed in some cultural characteristics, and preserved its morphologic and cultural peculiarities. Passing through guinea-pigs, it killed in slightly longer time than the typical diphtheria-bacillus. That it was an atypical form is probable from the fact that it persisted for longer periods of time in the throats in spite of antiseptic treatment, many of those children developing diphtheria later, the bacillus then being typical; and further, diphtheria-antitoxin pro-

¹ Arch. of Pediatrics, Nov., 1897.

³ Phila. Med. Jour., Mar. 5, 1898.

⁵ Brit. Med. Jour., Jan. 15, 1898.

² Brit. Med. Jour., Jan., 1898.

⁴ Am. Jour. Med. Sci., Dec., 1897.

⁶ Ibid., Apr. 9 and 16, 1898.

tested against it. W. J. Class¹ studied 27 cases, with the view of determining the relation between the different forms of the Klebs-Löffler bacillus and the severity of the disease. He draws the following conclusions: 1. That the short Klebs-Löffler bacillus apparently produces a toxin of greater virulence than the longer forms, although local manifestations may not be so extensive. 2. That the long Klebs-Löffler bacillus and the streptococci when found alone (together) give rise to a mild type of the disease. 3. The streptococcus is found associated with the short bacillus in the most severe cases; possibly by causing a more intense inflammatory reaction, it opens avenues by which the toxins of both are more readily absorbed. 4. The beneficial action of antitoxin in cases in which the Klebs-Löffler bacillus is not present may be due to the fact that although the local effect of different microbes varies, there are many features of similarity in the constitutional symptoms produced by them. Schuetz² has found in tuberculous lungs diphtheria-bacilli and other bacilli which were sometimes identical in appearance with the diphtheria-bacilli, and sometimes so short and round as to be indistinguishable from cocci. He warns, therefore, against making a diagnosis of throat-infection, due altogether to a simple smear-preparation, without proper cultures. None of the patients had had diphtheria, but inoculating lower animals with the bacilli produced effects similar to those of the Klebs-Löffler bacillus, and diphtheria-antitoxin protected against them. E. Franke³ compares the characteristics of the bacillus xerosis with those of the true and pseudodiphtheria-bacillus. Upon blood-serum and agar the xerosis bacillus resembled closely the diphtheria-bacillus. It is not pathogenic for animals. It grows more abundantly on Löffler blood-serum and on peptone-agar than the pseudobacillus. Neisser's method of staining decolorizes the xerosis and pseudobacillus, while the diphtheria-bacillus retains the stain. Bouillon is rendered acid by the diphtheria-bacillus, alkaline by the xerosis bacillus, and is not affected by the pseudodiphtheria-bacillus. J. E. Walsh⁴ suggests a **new nomenclature** for the pseudomembranous deposits in the throat, based on their etiology—viz., staphyloangina, streptoangina, and Klebs-Löffler angina. He describes the Klebs-Löffler bacillus, as does also F. L. Wachenheim.⁵

E. Czapslewski⁶ discusses the etiologic significance of the Löffler bacillus. He grants that Koch's second postulate is not applicable to the diphtheria-bacillus, as it may be found in even healthy persons; but this postulate is not vigorously insisted upon for any bacterium to-day, and therefore the specificity of the Löffler bacillus is not denied because of this. With regard to the third postulate, it does not, as Hennig says, reproduce typical diphtheria when injected subcutaneously; but he overlooks the fact that this method is used only to test its virulence, and that it will cause the formation of pseudomembranes on mucous surfaces. Further, the bacillus, in pure culture or its toxins, will produce paralyses, in character, distribution, and time of occurrence closely resembling those seen in man after diphtheria; and albuminuria occurs after injection of the bacillus. The author emphasizes the importance of the bacillus from the standpoint of etiology, the spread of the disease being much better understood now than formerly; of diagnosis, in clearing up doubtful cases; and of treatment, in rendering possible the production of the antitoxin, which has made the prognosis very much less grave.

R. L. Pitfield⁷ and J. E. Walsh⁸ give the **life-history of the diph-**

¹ Jour. Am. Med. Assoc., Apr. 30, 1898.

² Berlin. klin. Woch., Apr. 4, 11, and 18, 1898.

³ Münch. med. Woch., Apr. 19, 1898.

⁴ N. Y. Med. Jour., June 18, 1898.

⁵ Ibid.

⁶ Deutsch. med. Woch., Jan. 22 and Feb. 12, 1898.

⁷ Therap. Gaz., Nov. 15, 1897.

⁸ Va. Med. Semi-monthly, Apr. 8, 1898.

theria-bacillus, including the means favoring and those antagonistic to its growth. A. Fullerton and A. Williams¹ give an instance of the **conveyance of diphtheria-infection** by an apparently healthy individual. They mention a French case in which the bacillus was found in the throat at the end of 15 months, and they urge the importance of bacteriologic examination before a convalescent diphtheria-patient, for the sake of others, can be removed with safety from isolation. They think it well that, after a school has been closed because of an outbreak of diphtheria, no scholar should be readmitted without a bacteriologic examination of the throat, whether there is a previous history of diphtheria or not. G. T. MacCoy² gives a review of an epidemic of 190 cases which occurred in Columbus, Ind., in the fall of 1896, during the national campaign. After the election and the cessation of "rallies" the epidemic declined. Müller³ examined the throats bacteriologically of 100 children in the hospital, none of whom presented clinical evidence of angina, but 24 of whom were found to have diphtheria-bacilli in the secretions. J. R. Johns⁴ reports an epidemic in an asylum for colored children. The spread of the disease was limited by general immunization with antitoxin and thorough disinfection of the building with formaldehyd.

[With the establishment of municipal bacteriologic laboratories and quarantine of cases of bacillary diphtheria, and the maintenance of such quarantine as long as cultures show the presence of bacilli, criticism has arisen even among the medical profession, that perfectly healthy people have their liberty restricted because of such cultures, and it has even been mentioned that such restriction is unjust.] This aspect of the subject is thoroughly reviewed by J. Fibiger,⁵ who, in an exhaustive article in which many instances are given of outbreaks of diphtheria following in the wake of people otherwise healthy, except for the presence of Klebs-Löffler bacilli in their throats, concludes: 1. Epidemics of diphtheria can be successfully combated only through isolation of individuals who have diphtheria-bacilli in their throats and the disinfection of their apartments. 2. Great obstacles interfere with the application of the method, partly because it would be possible only after repeated examinations to find out all of those harboring bacilli; but especially because it would be necessary to isolate very many individuals, and some of them for a very long time. This obstacle must be emphasized, for the isolation of such individuals is not only a proposition, but an important hygienic doctrine. 3. Diphtheria-bacilli have been found in the mouth of a 16-year-old boy 9 months after recovery from diphtheria. 4. Diphtheria-bacilli disappear sometimes from the throat when the host is attacked with streptococcus- or staphylococcus-angina.

W. K. Jaques⁶ and C. T. McClintock⁷ discuss the **municipal control** of diphtheria, and lay stress upon its importance.

J. L. Berry⁸ reports **an epidemic** in the town of St. Johnsbury, Vt., and notes of 90 cases are given, showing in a great measure the spread of the disease from case to case. In several instances it was observed that severe cases of the disease were contracted from mild cases, and that many cases mild at the beginning became severe later. An interesting epidemic of 4 cases of lobar pneumonia is reported by E. D. Ferguson.⁹ All of the patients presented a pseudomembranous deposit in the throat 2 days before death, which occurred

¹ Lancet, Oct. 23, 1897.

² Jahrb. f. Kinderh., Band xliii., S. 54.

³ Berlin. klin. Woch., Aug. 30, 1897.

⁴ Med. Age, Jan. 25, 1898.

⁵ Indiana Med. Jour., No. 12, 1897.

⁶ Phila. Med. Jour., Apr. 2, 1898.

⁷ Jour. Am. Med. Assoc., Mar. 12, 1898.

⁸ Med. Rec., Feb. 12, 1898.

⁹ Jour. Am. Med. Assoc., Apr. 23, 1898.

in all the cases. Klebs-Löffler bacilli were found in all instances in cultures from the exudate in the throat. The source of infection could not be determined. A polluted well from which all of the patients had drunk was examined bacteriologically. Cultures showed bacilli which in morphology and staining-reactions resembled Klebs-Löffler bacilli; but further test showed that the germ was one of the numerous water-bacilli which do not liquefy gelatin. The author does not commit himself as to the germ causing the pneumonia. Postmortem examinations were not allowed. [In a somewhat similar case, in which we had the opportunity of making a necropsy, pseudo-membrane was found on the vocal cords, in the trachea, and in the larger bronchi. Cultures from these places revealed Klebs-Löffler bacilli, while the culture from the cut surface of the consolidated lobe of the left lung gave a pure culture of diplococci.]

Pathology.—B. Mouravieff,¹ as a result of experimental studies in investigating the **action** of the diphtheria-toxin **on the nervous system**, found that lesions in the spinal cord preceded the development of paralyses, which occurred only when neuritis set in. Lesions in the brain and medulla (chromatolysis and vacuolization) were not marked. The spinal ganglia were only slightly affected, except in 1 case, in which the nuclei and also the posterior roots and columns of Goll were very much degenerated. The heart and muscles were unaffected, except in those cases in which the nerves were greatly degenerated, a rupture of the muscular fibers then occurring. The vascular lesions consisted of capillary hemorrhages. The diphtheria-toxin is an elective poison, which picks out for its action the motor cells of the cord and the peripheral motor neuron, respecting usually the white substance.

Sevestre,² in discussing a paper by Barbier, thinks that the presence of the diphtheria-bacilli, when obtained postmortem from the internal organs (spleen and medulla), does not depend simply upon propagation, but upon **post-mortem diffusion**. He quotes Martin, who found bacilli in the blood 24 hours after death, when cultures from the blood a few moments after death had been negative.

In reply to Barbier's explanation of **diphtheric paralysis** as due to the presence of the bacilli in the medulla, he quotes Roux's experiments in producing paralysis with toxin alone. Lemoine stated that he had found, 5 hours after death, the Löffler bacillus in the blood of the heart. Barbier, in reply, thinks that the affection of the medulla would not be so great compared with the lesions found elsewhere, if it were caused by the toxin absorbed in the throat and circulated quickly through all the organs, but that the selection of the medulla by the poison is because of its being generated in that locality.

Spronek³ has tried the effects of **antidiphtheria-serum injected hypodermically** or intravenously on albuminuria produced experimentally in rabbits by the injection of diphtheria-toxin. From his experiments he draws the following conclusions: 1. The hypodermic injection of 10 c.c. of antidiphtheria-serum or of nonimmunized horse's serum (without the addition of antiseptics) produces in rabbits weighing 2 to 3 kilos a very slight albuminuria, which lasts only 24 hours, and is due simply to a filtering through of some of the injected serum. 2. The passage of this albumin is rather more marked and lasts longer when the rabbit is suffering, or is just recovering, from diphtheric albuminuria. 3. Antidiphtheria-serum does not in any way aggravate a preexisting diphtheric albuminuria in the rabbit, even when relatively large doses are injected hypodermically. 4. On the contrary, it has a favor-

¹ Arch. de Méd. expér., Nov., 1897. ² Gaz. hebdom. de Méd. et de Chir., Nov. 11, 1897.

³ Sem. méd., Nov. 24, 1897.

able action if injected at the beginning or not later than 24 to 48 hours after its appearance. 5. Antidiphtheria-serum is incapable of removing a diphtheric albuminuria; but it may modify its course favorably both in intensity and duration. 6. It is too early to transfer these conclusions from animal to man; still, they bear a striking analogy to those formulated by Sevestre and Martin from clinical observation. One important fact taught by the author's experiments is that good from injecting antitoxin can result only in recently established diphtheric albuminuria, and this probably accounts for the clinical observation that the action of antidiphtheria-serum on diphtheric albuminuria is inconstant. 7. To explain this favorable action, one must suppose that the antitoxic substance, having a special affinity for the toxin, neutralized a part of the latter, which has been assimilated by the renal cells.

F. L. Morse¹ discusses the **causes of death from diphtheria**. He analyzed 1972 cases of diphtheria treated in the Boston City Hospital since Sept., 1895; all were cases of diphtheria clinically, the diagnosis in most of them being confirmed by bacteriologic examination. The mortality was 13.3%, antitoxin being used in every case. From 1891 to 1895 1760 cases were treated without antitoxin, with a mortality of 43.1%. The causes of death are classified as follows: 107, sepsis; 91, bronchopneumonia; 52, cardiac complications; 13, exudation; 1 each of general tuberculosis, empyema, typhoid fever. Of the 266 deaths, 109 occurred in the first 48 hours after admission. All but 8 of the cases of bronchopneumonia were operative. Twenty of the 52 deaths from cardiac complications occurred before the seventh day. As this is the earliest day that cardiac paralysis due to nervous degeneration appears, these cases may be considered due to profound depression caused by the toxin. Cardiac failure on the seventh day or later is considered to be due to the nerve-degeneration. These complications arose in one case as late as the sixty-fourth day.

W. G. Thompson² reviews the **theories of immunity** which were given at some length in the YEAR-BOOK for 1898. S. Flexner and H. B. Anderson³ report the results of experiments in which they injected pure cultures of diphtheria-bacilli into the tracheas of rabbits. They conclude that an actual increase of microorganisms takes place, and that they may be distributed throughout the body. The histologic changes consisted of edema, congestion of the blood-vessels, and swelling of the epithelial cells of the respiratory passages. The small vessels contained thrombi, and in the alveoli were desquamated cells, with giant cells in the alveolar walls. These **experimental pneumonias** were lobar or pseudolobar in character, fibrin playing a subordinate role in their production.

[The subject of **mixed infection** in diphtheria is one of the most important in the discussion of the etiology and pathology, for two reasons: 1. It is because of this occurrence that there is still a considerable number of clinicians who do not consider the Klebs-Löffler bacillus as the sole cause of diphtheria. 2. Much of the hostility to the use of antitoxin depends upon the lack of success attending its use after mixed infection has set in.] The importance of the subject is recognized by P. Hilbert,⁴ in an exhaustive article in which the results of many experiments and clinical observations are given. He has confirmed the results of previous investigators, especially those of Roux and Yersin, Klein, and others, all of whom found, as is well known, an increase in the virulence of the diphtheria-bacilli when associated with streptococci. Hilbert further found that the streptococci them-

¹ Ann. of Gyn. and Pediat., No. 7, 1897.

² Med. Rec., Jan. 8, 1898.

³ Bull. Johns Hopkins Hosp., Apr., 1898.

⁴ Deutsch. Arch. f. klin. Med., Dec., 1897.

selves were also increased in virulence by this association. The influence of staphylococci upon the diphtheria-bacillus is not certain, some experiments showing an increase in virulence, while others showed a lessening. The same may be said of tetracocci, whose presence seems, however, to increase the extent of the local process. Hilbert recognizes the existence of the pseudodiphtheria-bacillus; and he found that when it was associated with the true diphtheria-bacillus the disease had a milder course. Study of the effect of serum-therapy in mixed infection gave the conclusions that while the amount of antitoxin used was sufficient to neutralize the amount of poison injected, yet the antitoxin did not prevent the bacilli from increasing the virulence of the streptococci. The antitoxin, however, clearly lengthened the lives of the animals to which it was given. Hilbert raises the question as to what constitutes a mixed infection. He found that very few of the cases under his observation gave a pure culture of diphtheria-bacilli. The results of his cultures compelled him to differ with Roux, Martin, and Chaillou, for all of his cases would be considered by them as cases of mixed infection. He thinks that the presence of microorganisms in the pseudomembrane is not alone sufficient ground for diagnosing mixed infection, but that there should be some visible effect upon the system. [Our own experience in examining cultures from cases of diphtheria leads us to agree with Hilbert, for we have in but very few instances found a practically pure culture of the diphtheria-bacillus.] The lesion of the mucous membrane which the diphtheria-bacillus produces favors the entrance of these germs into the body; and too much emphasis, therefore, cannot be laid upon the importance of healing this local lesion as quickly as possible. It has been proved beyond peradventure that no remedy accomplishes this so quickly as the antitoxin when given in the earliest stages of the disease.

J. J. Thomas¹ studied the **changes in the nervous system** which occur in diphtheria, and which he considers are due to the toxin rather than to the actual presence of the bacilli in the sites affected.

C. Spronck² believes that **the pseudodiphtheria-bacillus** can be distinguished from the true bacillus only by animal experiments. As the result of investigations, his conclusions are: 1. Diphtheria cannot be diagnosed with absolute certainty by the naked eye, nor by microscopic examination of the colonies grown on serum. 2. An animal must be inoculated with the microbe, except in times of epidemics. 3. When 2 c.c. of fresh culture do not kill a guinea-pig of 300 gm., but only cause edema, the bacillus is that of pseudodiphtheria. Further confirmation of this is obtained by previous inoculation with antidiphtheria-serum. 4. Bacilli in the mouth, of saprophytic character, however resembling diphtheria-bacilli in appearance, if they do not answer the above tests, cannot give rise to diphtheria. 5. A very attenuated diphtheria-bacillus cannot live in a human body.

Diagnosis.—L. Cobbett³ recommends the use of ox-serum as a culture-medium for the diphtheria-bacillus. Its advantages are that the true bacillus can be easily distinguished from the bacillus of Hoffman, as the colonies of the former are flat, almost colorless, and indented at the edge somewhat like a daisy; while the colonies of the bacillus of Hoffman are elevated, brilliant white, and do not adhere to the surface, and give no opalescence in the medium. The disadvantage of the medium is that it takes several days to get a characteristic culture, while horse-serum gives a culture within 6 or 8 hours. The method of the preparation of the serum is given. S. Delepine⁴ describes the method of conducting bacteriologic examination of cases of suspected diph-

¹ Boston M. and S. Jour., Jan. 27, 1898.

² Lancet, Feb. 5, 1898.

³ Sem. méd., Sept. 29, 1897.

⁴ Ibid., Feb. 12, 1898.

theria in Manchester, Eng. Three hundred and eleven specimens were examined, the bacteriologic diagnosis being confirmed clinically in all but 4% ; while in 50% the examination cleared up a doubtful clinical diagnosis.

Symptoms.—F. Jessen¹ reports a case of chronic diphtheria in which the **clinical evidences of the disease persisted for more than 5 months**, the diphtheria-bacillus being constantly present in cultures. The general symptoms were very slight, there being exudation in one location or another all the time, which was not affected by antitoxin ; and all local applications had no effect, except lactic acid, which destroyed the exudation rapidly, although it reformed constantly. The blood-serum of the patient protected 20 times more than normal serum against injections of diphtheria-bacilli ; the absence of symptoms of general intoxication during the greater part of the time, the author thinks, may be explained possibly by the infiltration of the mucous membrane of the pharynx preventing absorption. C. Meyer² adds 2 cases to the list of chronic or prolonged diphtheria. The first case was a boy, 2 years old, sick with pharyngeal and laryngeal diphtheria for 32 days, the case ending fatally a week after tracheotomy had been performed. The author considers the long duration of the disease an evidence of the specific property of antitoxin ; the immunity served to prolong life, but the body could not furnish active immunity for definite recovery. The second case was in a girl, 3 years old, starting with laryngeal stenosis and left-sided pneumonia. Tracheotomy was necessary, the tube remaining in place for about a week. For more than a month there was bronchitis, and cultures from the expectoration always showed the diphtheria-bacillus ; and 2 months later another tracheotomy was performed, followed by pneumonia. Recovery ultimately ensued, but bacilli were found in the secretions up to about one and one-half years after the primary attack. The pharynx showed no abnormality. Golay³ also reports a prolonged case. From March 11, 1896, until March 9, 1897, there were frequent attacks of tonsillitis, and every culture showed the presence of the short diphtheria-bacillus. The parents then declined to allow further cultures to be taken, and the child remained well for 6 months longer. The author is of the opinion that the bacilli were never really absent, and he concludes that : 1. A fortnight's isolation after the disappearance of the false membrane, as advised in classical works, is totally inadequate ; not till 3 or 4 examinations, at intervals of a week, have proved the complete absence of the bacilli can a cure be considered permanent. 2. The presence of Löffler's bacillus between the attacks of angina does not affect the general health. 3. The prolonged presence of diphtheria-bacilli after the disappearance of the membrane is the rule rather than the exception ; but probably this period is not so prolonged when there is associated streptococcus-infection. 4. Local treatment should be abandoned entirely, as its only use is to torture the patient. In the case given above, a large number of the local applications recommended by Löffler and others were tried thoroughly, without the slightest effect.

J. Nicholas and P. Courmont⁴ consider the **leukocytosis** in diphtheria to be a symptom of intoxication, and to constitute a defensive reaction of the system. It is often absent in sudden intoxication, and is always constant in the slower cases. It is sometimes absent after immunization. Riether⁵ reports 31 cases of **diphtheria in nurslings**, and believes that while it is not very frequent, yet it is not so uncommon as is generally thought. It begins

¹ Centrbl. f. innere Med., May 15, 1897.

² Deutsch. Arch. f. klin. Med., Band lix., S. 465.

³ Rev. méd. de la Suisse Romande, Nov. 20, 1897.

⁴ Arch. de Méd. expér., July, 1897.

⁵ Wien. klin. Rundschau, No. 28, 1897.

usually in the nasal passages, and affects weak children especially. The author uses antitoxin, and believes that there is no danger in it for children even in the earliest weeks of life.

W. R. Coues¹ reports a case of **diphtheria of the vulva** in an infant 8 months old. The diphtheria-bacilli were found in cultures taken both from the vulva and from the pharynx. Clinical manifestations were absent in the latter place. The primary place of infection could not be determined. Recovery ensued under the use of antitoxin. He also reports² 2 additional cases; one in a girl 2 years of age, the other in an infant 21 months old. The latter terminated fatally.

F. W. Taylor³ reports a successful case of **intubation** in a boy 4 months and 10 days old.

Freymuth and Petruschky⁴ report a case of **noma pudendi** in which the bacillus diphtheriae was found. Recovery followed the use of antitoxin. There was extensive involvement. They also report⁵ a case of facial noma associated with the presence of the diphtheria-bacillus; recovery also following the use of antitoxin.

C. Todd⁶ describes a form of external rhinitis, due to the Klebs-Löffler bacillus, affecting children in hospitals during convalescence from scarlet fever. There is no formation of membrane and little or no discharge. The condition is contagious, but does not give rise to faucial or laryngeal diphtheria. What discharge there was caused the formation of pustules on portions of the body where it lodged. The author considers that the virulence of the bacilli is slight, but that probably a higher degree of virulence may develop under certain conditions and give rise to laryngeal involvement.

A. MacGregor⁷ reports the case of a boy, 8 years old, in whom virulent bacilli persisted for 6 months after an attack of diphtheria. At that time the heart was still enlarged and the legs were weak.

J. B. Ogden⁸ reports the case of an adult with the unusual sequelæ of pain and loss of sensation in the legs, which spread until the anesthesia extended to the waist-line, with loss of control of the sphincters. Two doses of trional, 15 gr. each, were given at rather long intervals; and 11 days after the first dose and 5 days after the second, hematuria existed.

W. G. Dickinson⁹ reports an attack of diphtheria following acute articular rheumatism. Antitoxin was used, and the rheumatism immediately returned in a severe form, complicated by pericarditis, pneumonia, and pleurisy.

D. Riesman¹⁰ reports an attack of diphtheria in an infant, 11 days old, in which there was an extensive pseudomembranous deposit, which gave an almost pure culture of diphtheria-bacilli. The child died in 24 hours. Antitoxin was not in extensive use at that time, so it was not given. The possible source of infection was the presence of many guests at the rite of circumcision, 8 days after birth. The author has reviewed in a scholarly manner the subject of **diphtheria in children under 2 years of age**, and concludes that: 1. Young infants, and especially new-born children, are in a high degree immunized to diphtheria. 2. This immunity depends on several factors: (a) slight infection-opportunity (better isolation, absence of prehensile movements, and practically sterile food); (b) the presence of antitoxin in the blood; (c) the absence of catarrhal conditions of the pharynx and air-passages in early life.

¹ Boston M. and S. Jour., Nov. 4, 1897.

² Ibid., Sept. 2, 1897.

³ Ibid., Sept. 22, 1898.

⁴ Ibid., Mar. 12, 1898.

⁵ Lancet, Jan. 15, 1898.

⁶ Ibid., May 12, 1898.

⁷ Deutsch. med. Woch., Apr. 14, 1898.

⁸ Lancet, May 28, 1898.

⁹ Boston M. and S. Jour., Feb. 17, 1898.

¹⁰ Phila. Med. Jour., Mar. 5, 1898.

J. C. Wilson¹ reports a case of total **bilateral deafness** following an attack of diphtheria in a woman 33 years old. Cultures from the membrane were negative as regards diphtheria-bacilli, the cultures having been taken after the institution of local treatment. Recovery followed the use of antitoxin, but deafness persisted at the time of the report, 7 months later.

H. D. Chapin² gives notes of a number of cases of diphtheria, with special reference to the **cardiac and circulatory symptoms** occurring in the course of the disease. He considers that the prognosis is fatal if there occurs an extreme slowing of the pulse. In one of the cases the drop was from 128 to 66 beats per minute; in another, to 28.

C. M. Hibbard³ analyzes the cardiac symptoms in 800 cases of diphtheria treated in the Boston City Hospital, and the conclusions are as follows: 1. A rapid pulse-rate in diphtheria is to be dreaded. Death usually results when it exceeds 150. 2. A slow pulse—60 in children—is a sign often of serious heart-trouble. 3. Irregularities in the pulse occur in about 10% of the diphtheria-cases, and are generally significant of cardiac complications. 4. A systolic murmur at the apex is heard in about 1 case in 10, and its prognostic value depends upon the nature of the cause. 5. A *bruit de galop* in diphtheria is a most fatal sign. 6. After 4 weeks, with no heart-symptoms in diphtheria, there is little probability of subsequent cardiac complication in the convalescence. 7. All diphtheria-patients who have tachycardia, bradycardia, irregular or weak pulses, systolic murmur at the apex, vomiting, or any paralysis—especially palatal—should be kept quietly in bed. 8. The most important element in the treatment consists in absolute rest in bed. 9. The vagus nerve in fatal cases always had some evidence of degenerative changes, and the weight of the heart was increased. 10. The cause of death is usually from cardiac thrombi, dilatation, or paralysis, produced most probably by the toxin of the diphtheria-bacillus.

H. L. Gordon⁴ reports a case of **diphtheria in a man 20 years old**; on the fourth day a marked slowing of the pulse set in, the rate being 40 per minute; the next day it was 35, and on the following day 10, rising to 50 just before death.

M. Bjorksten⁵ describes a **peculiar case** of diphtheria, in the course of which there were edema, hepatic enlargement, albuminuria, and a systolic cardiac murmur. The disease subsided and these symptoms disappeared; but after 4 weeks there was a sudden attack of incontinence of urine; followed by aphasia, right-sided hemiplegia, and paralysis of the right facial nerve and of the soft palate. Recovery ensued ultimately.

Larval diphtheria⁶ in the course of epidemics is described as occurring in 3 forms: 1. An angina not presenting false membrane, but showing diphtheria-bacilli. 2. The bacilli are present with neither local nor general symptoms. 3. Convalescents in whom the bacilli persisted. This clinical feature was studied in 2 epidemics among soldiers stationed at Lyons, and of 108 examined, but 9 cases of membranous diphtheria were found, while 23 had the larval form. The importance of larval diphtheria lies in the observation that the bacilli persisted a long time in these cases, and thus strengthens the belief that the disease is spread by the existence of "silent" diphtheria in human beings, which breaks out into the classic disease when conditions favoring the virulence of the bacillus are present.

Treatment.—It seems to us almost superfluous now to mention indi-

¹ Am. Jour. Med. Sci., Oct., 1897.

² Med. Rec., Jan. 15, 1898.

³ Boston M. and S. Jour., Jan. 27, 1898.

⁴ Brit. Med. Jour., Jan. 8, 1898.

⁵ Ibid., Oct. 16, 1897.

⁶ Yale Med. Jour., May, 1898, from Rev. de Méd., No. 1.

vidually the immense number of papers reporting series of cases treated with the **antitoxin**, all giving favorable results. Aylward,¹ in a mild epidemic of 96 cases, reports a mortality in 24 cases treated without antitoxin of 12½%, and in 72 antitoxin-cases 4.16%. With regard to the rashes following the use of antitoxin, the case reported by J. L. Morse² seems to indicate that they may perhaps be due to a peculiarity of the individual rather than to the serum itself. The patient received a prophylactic dose of 5 c.c. (500 units), followed in 5 days by urticaria, chilliness, prostration, vomiting, and edema of the uvula and pharynx. The acute symptoms subsided in 36 hours; but by that time general glandular enlargement developed and lasted for 10 days. A transient urticaria had occurred 2 years previously in the same patient after an injection of 7 c.c. Serum from the same horse, but not from the same bottle, was used upon other patients without bad effects. M. Flesch³ reports the case of his 7-year-old daughter, in whom an injection of diphtheria-antitoxin was followed in 10 days by albuminuria and urticaria, and later by swelling of the hip-joint. Flesch considers these symptoms the result of an infection, and while a firm believer in the value of antitoxin, thinks that its preparation is not always supervised perfectly. J. L. Porteous⁴ administered antitoxin by the mouth in 5 cases, with satisfactory results. He claims to have been the first to use this mode of administration. In this connection the experiments by C. Fisch⁵ are of interest. He introduced into the stomachs of puppies and kittens milk found to possess antitoxic properties, and taken from animals rendered immune by repeated injections of toxin; a certain degree of immunity was found to be conferred by this milk upon young animals. Adult guinea-pigs treated in the same way were also found to be immune. Serum taken into the stomach was found to render the blood of the experimenter and three other men antidotal to diphtheria-toxin. Antitoxic properties of the blood were, however, only found 24 to 36 hours after ingestion of the serum, so that the employment in practice of this mode of administration is limited, and can only take the place of immunizing and not of curative injections. C. Meyer⁶ reports the use of antitoxin in 157 cases. He is convinced of the value of the serum-treatment; he believes that the serum has not a curative action, but does good by preventing the further injurious effects of the disease, thereby enabling nature to cure the lesions already produced; and he therefore believes that repeated injections are not only useless, but sometimes injurious, and thinks that a single injection of 1000 units sufficient. D. Böttcher,⁷ reporting 200 additional cases in Giessem, thinks from his experience that a concentrated preparation of antitoxin is of the greatest value, and that a single large dose is better than several small ones. H. C. Ernst⁸ has found that freezing diphtheria-antitoxin causes it to separate into several layers of different densities, the lower of which increased greatly in antitoxic properties, there being a corresponding loss in the upper layers. H. Pitschke⁹ had a mortality of 40% in tracheotomy-cases of diphtheria; since using antitoxin he has had 28 consecutive cases without a death. Krönlein¹⁰ has analyzed the statistics of the Canton of Zurich for 18 years, and while the number of cases for 1897 (1500) exceeded those of 1880 (1000), the mortality last year was 6%, as against 24% for 1880; not only a relative, but also an absolute, reduction in the mortality. H. Kossel¹¹ gives further figures for diphtheria in Berlin.

¹ Loc. cit.² Berlin. klin. Woch., Jan. 21, 1898.³ N. Y. Med. Jour., Apr. 9, 1898.⁴ Deutsch. med. Woch., Jan. 13 and 20, 1898.⁵ Münch. med. Woch., Mar. 15, 1898.⁶ Boston M. and S. Jour., Feb. 17, 1898.⁷ Med. Rec., Dec. 25, 1897.⁸ Deutsch. Arch. f. klin. Med., Dec. 22, 1897.⁹ Phila. Med. Jour., May 14, 1898.¹⁰ Phila. Med. Jour., May 7, 1898.¹¹ Deutsch. med. Woch., Apr. 14, 1898.

In 1896 and 1897 there were in all Berlin only about the same number of fatal cases as there had previously been in the hospitals alone. The total mortality has fallen to almost one-third of the average before the introduction of antitoxin. Similar experiences are mentioned in all the German cities and in Paris. A. Baginsky,¹ in giving a further report of the use of antitoxin in diphtheria, points out that the main reduction of the mortality occurs in infancy, when diphtheria is especially fatal. The favorable influence of antitoxin is not limited, however, to this age, but is seen in all ages. With regard to its disadvantages, such as urticaria, etc., he justly states that there would have to be great dangers from such a valuable remedy as antitoxin to justify its abandonment in such a disease as diphtheria. With regard to the reported cases of sudden death after injection of antitoxin, he holds the opinion similar to that expressed in the YEAR-BOOK for 1898. His experience in immunization leads him to conclude that immunity is lost at the end of 3 weeks after the injection, and that its use therefore should be limited to hospitals and institutions or houses in which there is an epidemic of diphtheria. Favorable experiences in combating epidemics of diphtheria in institutions are reported by E. L. Twombly,² W. P. Northrup,³ F. G. Morrill,⁴ Slawyk,⁵ W. Gripper,⁶ and W. M. Donald.⁷

C. P. B. Clubbe⁸ reports on 600 cases of diphtheria which have been under his care in the Sydney Children's Hospital. The first 300 were treated without antitoxin; the last 300 with antitoxin; the other points of treatment being the same; therefore the contention that a comparison of results is valueless because the cases have not been treated in the same place, by the same man, cannot hold with regard to this report. The diagnosis was confirmed in all of the cases bacteriologically. The 300 nonantitoxin-cases had a mortality of 158; the 300 antitoxin-cases had a mortality of 60.

Schmidt and Pfanz⁹ report some interesting experiments upon guinea-pigs by injection of serum both from the placental blood of a human female, taken at the time of delivery, and of milk. The animals then received an ordinarily fatal dose of diphtheria-toxin. The results of these experiments showed: 1. That antitoxic substances found in the blood of parturient women exist also in the milk; 2, that the quantity of antitoxic substance excreted with the milk is much less than that found in the blood; and 3, that to exert an antitoxic effect equal to that of the blood the milk should be injected in quantity several times greater than that of the blood required.

I. N. Snively¹⁰ discusses the lines upon which the further reduction in the mortality from diphtheria by antitoxin depends. The 3 factors given prominence are: 1. A still greater improvement in the production and selection of the remedy. 2. The general and hearty acceptance of the established principles underlying serotherapy. 3. The employment of the remedy upon a purely rational, rather than upon an empiric, basis. Binder¹¹ studied the effect on the blood of the administration of antitoxin by the mouth. Healthy children were so treated, and their blood-serum 12 and 24 hours after was obtained, with the result that only in infants could a slight increase in the antitoxic property of the blood-serum be noticed. The conclusion is reached that this method of administering antitoxin will not produce sufficient protection in the treatment of diphtheria.

¹ Arch. f. Kinderh., Band xxiv., Heft 5 and 6.

² Med. News, Dec. 25, 1897.

³ Deutsch. med. Woch., Feb. 10, 1898.

⁴ N. Y. Med. Jour., May 21, 1898.

⁵ Wien. klin. Woch., No. 42, 1896; Am. Jour. Med. Sci., May, 1897.

⁶ Med. News, Nov. 20, 1897.

⁷ Boston M. and S. Jour., Dec. 23, 1897.

⁸ Boston M. and S. Jour., Mar. 3, 1898.

⁹ Brit. Med. Jour., Mar. 26, 1898.

¹⁰ Brit. Med. Jour., Oct. 23, 1897.

¹¹ Berlin. klin. Woch., Sept. 20, 1897.

With regard to the persistence of the germs in the throats of convalescents and of otherwise healthy individuals, we¹ have had excellent results following the topical application to the pharynx and tonsils of a 60-gr. silver-nitrate solution, cultures being entirely negative after 2 or 3 paintings.

Measles.—H. Koplik² reports 16 cases of measles in which the detection of his early sign established the **diagnosis**. These bluish-white spots, with a red base, appearing on the mucous membrane of the lips and cheeks, may be seen as early as 72 hours before the appearance of the usual characteristic eruption, and they have not been observed in any other disease. R. H. A. Hunter³ reports a case of measles **in an infant** 16 months old, the preeruptive fever rising to 107° F., four days later taking a sudden jump to 110° F., with unconsciousness, disappearance of the rash, and convulsions. The cold pack controlled the symptoms and recovery ensued. C. E. Douglas⁴ reports a case of measles developing in an infant on the tenth day of life. The author believed that infection had been conveyed by himself. J. H. Battye⁵ observed a case in which the **rash** of measles recurred 3 times, being attended on each occasion by a renewed elevation of temperature, after having almost entirely disappeared. The entire eruption-period lasted 10 days. Slawyk⁶ observed 52 cases of measles with reference to Koplik's diagnostic sign, and proved that it was present in 45 of the cases, or 86½%. By the help of this sign it was possible to isolate cases in the first or second day of the prodromal symptoms. E. Libman⁷ found the eruption in each of 50 cases. W. P. Northrup⁸ gives the statistics of an epidemic of measles in the N. Y. Foundling Hospital. Two hundred and sixty-eight cases occurred, with 36 deaths. Hutinel⁹ analyzes the bronchopulmonary complications of measles, and gives many valuable points with reference to their development. A simple infection of the bronchial mucous membrane, due to the usual unhygienic causes, in association with the ordinary pyogenic bacteria, may, under certain conditions, become contagious when the virulence of these germs has been greatly increased. For example, if a child already suffering from streptococcic bronchopneumonia is admitted to a hospital-ward containing children with simple measles, the latter cases quickly become complicated, more or less seriously, with the same pulmonary lesions. A child who, previously to measles, has had a bronchopulmonary infection, may have a reappearance of this infection with the outbreak of measles, even though he has been apparently well of the preceding trouble for some time. The previous existence of actual bronchopneumonic lesions is not necessary, provided the infection itself has existed. Taken in its widest sense, such preexistent infection embraces the subject of former tuberculosis, those that have had simple or specific catarrhs or localized pharyngeal infections, and, finally, those old hospital-sojourners whose mouths and nasopharynxes have had a chance from their surroundings to become infected with virulent microbes. The crowding together of children increases the virulence of the germs and the number and gravity of the infections. Frequently one observes the progressive aggravation of measles in isolating-wards which cannot be frequently disinfected. Cases usually enter these pavilions in successive series. The first are usually benign cases; in the second series the fever falls less promptly, and more or less serious complications are noted; with the third series bronchopneumonias

¹ Phila. Med. Jour., Aug. 27, 1898.

² Brit. Med. Jour., Apr. 30, 1898.

³ Lancet, May 14, 1898.

⁴ Med. Rec., June 11, 1898.

⁵ Med. Rec., Apr. 9, 1898.

⁶ Ibid., May 7, 1898.

⁷ Deutsch. med. Woch., Apr. 28, 1898.

⁸ Med. News, Dec. 25, 1897.

⁹ Presse méd., No. 38, 1897.

often appear. These at first do not seem severe; but soon the severity of the complication increases, and fatal cases or subacute bronchopulmonary infections become common. It is to be observed that not only preexistent infections of the respiratory passages may cause bronchopneumonia in rubeolous patients, but the infection may be heteromorphous. A child may present a more or less grave cutaneous infection; following a measles he has a chance of infecting the lung. An intestinal or buccal infection may act in the same way. Clinically the bronchopulmonary complications of measles present 3 principal types: 1. A very acute form, developing as a suffocative catarrh. 2. An acute form, having all the characters of bronchopneumonia. 3. A subacute or delayed form, suggesting tuberculosis, which may be called a pseudotuberculous bronchopneumonia. In order to avoid the bronchopulmonary complications of measles it is therefore necessary to realize as much as possible the asepsis of the rubeolous patients and to disinfect the quarters in which such patients are cared for. F. M. Allison¹ reports a case of a child, 15 months old, with whooping-cough and pneumonia, in whom measles developed, with a temperature of 109° F. Applications of ice brought the temperature down, but it rose quickly, and with a sudden disappearance of the rash death ensued. In a discussion as to how far mandatory measures are of value and practical in measles and whooping-cough, P. H. Brice,² urges that not only physicians, but also teachers in schools and households, should be required to report to the medical health officer every case of this disease occurring in their jurisdiction.

Scarlet Fever.—C. Seitz³ investigated 11 cases of scarlet fever bacteriologically, with negative results. A twelfth case was associated with streptococci, which were considered to be a secondary infection. He analyzed 800 cases seen in his clinic in the past 10 years; the annual mortality varied from 3½% to 20%, seeming independent of atmospheric conditions and seasons. Family predisposition seemed to play a strong part, 371 of the cases occurring in 152 families. 50% of the patients were between 2 and 5 years of age, and only 3.9% were less than 12 months old. Sepsis was the most fatal complication. Nephritis arose without any apparent relation to season or diet; it occurred rather more often in summer than in winter, and as often in those carefully dieted as in those allowed any kind of food. H. Low⁴ reports a case of scarlet fever complicated with acute suppurative otitis media and acute hemorrhagic septicemia. A culture from the blood showed the presence of streptococci. Recovery followed the use of antistreptococcic serum.

P. Meyer⁵ describes the **new clinical sign observed in scarlatina**, consisting of numbness of both hands, with formication. The numbness may be absent, and only a tingling feeling in the palmar surface of the finger or hand be present. Occasionally the sign is present in the feet, either alone or also in the hands. It appears during the eruption, rarely before it, and may not occur until the fourth or fifth day. It lasts from a few minutes to several hours or days, usually having periods of intermission. Very rarely there is paresis of the extremities. It was observed in 79 out of 100 adult cases.

F. Draper⁶ describes a **case of malignant scarlet fever**, with sudden onset, vomiting and purging of green matter, headache, delirium, and a high fever, and accelerated pulse and respiration. Coma developed; but with cold applications to the shaved head improvement set in, and convalescence

¹ Brit. Med. Jour., No. 1880, 1897.

³ Münch. med. Woch., Jan. 18, 1898.

⁵ Presse méd., Mar. 5, 1898.

² Ibid., Sept. 25, 1897.

⁴ Lancet, May 19, 1898.

⁶ Brit. Med. Jour., Feb. 19, 1898.

was established in 5 days. R. Engleman¹ gives her experience with anti-streptococcus-serum in scarlatinal and diphtheric lesions of the throat. Notes of 6 cases are given in which the serum was used, 2 of which died. T. O. Roe² gives notes of 3 cases of scarlet fever. One was a very severe case, with high fever (105° F.), in whom sudden dilatation of the left ventricle seemed to occur, with cyanosis and collapse. The case terminated fatally. The second case was complicated by cellulocutaneous erysipelas of the neck; a complication in the third case was that of orbital abscess. Recovery ensued in the last 2 cases.

E. M. Cosgrave³ reports 2 cases in which **relapses** occurred; in the first on the twenty-eighth day, in the second on the eighteenth day.

N. Lemoine⁴ reports 23 cases of scarlet fever in which the **eruption remained limited to the face**. He considers cases of this nature to form a transition-stage between anginoid scarlatina and scarlatina with general eruption. [In a case which we observed recently the eruption limited to the face was so typical that the diagnosis was clear.]

Roger,⁵ from observation in a number of cases, decides that the **mother with scarlet fever or measles** can nurse her infant at the breast with very little danger of the child's contracting the disease. This immunity is explained by Roger on the supposition that the children ingest the toxins or attenuated germs in the milk. [It seems to us more probable, in view of the animal experiments conducted by many investigators, that antitoxins rather than toxins exist in the milk to protect the children.]

A. K. Gordon⁶ records a severe case of scarlet fever in which improvement seemed to follow immediately upon the administration of **antistreptococcic serum**. Cultures from the throat revealed streptococci and staphylococci. Sperawsky⁷ treated with arsenic 12 children who had been exposed to scarlet fever, and none of them contracted the disease. [In view of the not very great contagiousness of the disease, these cases are too few to warrant any positive conclusions.] I. Pujador⁸ recommends the use of **oil of turpentine** hypodermically or by the mouth in scarlatina, for the purpose of preventing or relieving renal complications. The author has observed improvement 3 hours after the injection; and a violet-like odor has been detected in the urine at the same time. So the conclusion is drawn that the drug acts immediately by absorption, changing the microbic metabolism by neutralizing the toxins and increasing phagocytosis.

Typhoid Fever.—An epidemic is reported⁹ which arose in the city of Bristol, England, and comprised 109 cases. Out of 30 infected houses 27 were found to have practically a **common milk-supply**. The epidemic is of interest from the fact that many children were affected. Landouzy and Griffith¹⁰ report a case of typhoid in a woman, 19 years of age, 3 months **after confinement**. The disease was of moderate severity and the serum-reaction was positive. The child which she had been nursing appeared to be in perfect health. Examination of its blood showed that the agglutinative power was quite distinctly marked. This case is in agreement with one mentioned in the YEAR-BOOK for 1898, reported by Griffith and Mossé. II. A. Fairbairn¹¹ compares the symptoms of typhoid fever as it occurs **in infants and adults**. He thinks that the reason why the disease is considered to be

¹ Med. News, Jan., 1898.

² Dublin Jour. Med. Sci., No. 203, 1897.

³ Med. Week, Sept. 3, 1897.

⁴ Med. Age, Sept. 16, 1897.

⁵ Brit. Med. Jour., Nov. 6, 1897.

⁶ Quart. Med. Jour., Apr., 1898.

⁷ Med. Age, Sept. 25, 1897.

⁸ Lancet, No. 3827, 1897.

⁹ Am. Jour. Med. Sci., Jan., 1898.

¹⁰ Soc. de Biol., Nov. 6, 1897.

¹¹ Jour. Am. Med. Assoc., Dec. 4, 1897.

of more sudden onset in children is because the premonitory symptoms are overlooked.

Varicella.—Additional cases (see YEAR-BOOK for 1897, p. 772) of **laryngitis** complicating varicella are described by Harley.¹ The early symptoms in each case were those of croup, but no false membrane formed and diphtheria-bacilli could not be found. The lesions consisted of small circular ulcerations on the vocal cords, and sometimes on the epiglottis. Children of weak constitution seem especially prone to it. The prognosis was graver the younger the child. The character of the eruption also influenced the prognosis. In one case which recovered the eruption was discrete, while in some of the others it was of a hemorrhagic variety, and in one case confluent. Tracheotomy was necessary in the one case that recovered. In the fatal cases death was the result either of spasm of the glottis or bronchopneumonia.

Pertussis.—**Etiology.**—H. Koplik² gives a more extended report on the bacteriology of pertussis, and of the organism found in 13 out of 16 cases observed by him. [It is extremely probable that the bacilli observed by Afanassjew, Czapslewski, and Hensel are the same as Koplik's bacillus.] R. Lee³ mentions the aggravation which cases of whooping-cough present when grouped together in the same room, which he thinks is due to **reinfection** through the vitiated atmosphere.

Prognosis.—F. D. Sanger,⁴ in discussing the prognosis and treatment of pertussis, arrives at the following conclusions: 1. Children under 1 year of age are particularly susceptible to pertussis, especially strumous, debilitated, and artificially fed infants. 2. The younger the child the greater the mortality, pertussis ranking as one of the most fatal diseases in children under 1 year of age. 3. The delicate lung-tissue of infants who survive an attack of pertussis may be irreparably damaged. 4. It is therefore of utmost importance that very young children be protected from contagion; this is best accomplished by removing them from the house where there are infected individuals, or, when this cannot be done, by as rigid isolation as can be accomplished in the home. In order to protect the young, diagnosis must be made early by careful attention to history, character of cough, appearance of face, vomiting, temperature, and examination of the chest. 5. Attention to the hygienic surroundings of the patient and careful nursing and feeding are of great importance. 6. Pertussis is a self-limited disease, for which there is no specific remedy or class of remedies; to ameliorate the distressing cough, diminish the number and severity of the paroxysms, and check excessive vomiting are the chief indications. 7. By diminishing the number and severity of the paroxysms, the danger of complications, which are largely mechanical, is minimized. 8. Cases should be watched closely and the chest examined systematically in order that complications may be discovered early and properly treated.

Treatment.—Nothing of special newness has been mentioned in the treatment of whooping-cough during the past year.

Eross⁵ gives the results of treatment in 874 cases, 832 cases being out-door patients, the remainder being seen in private practice. The drugs used internally were potassium bromid, tincture of belladonna, codein, quinin, antipyrin, phenacetin, antifebrin, bromoform. Resin of benzoin was used by insufflation. The least benefit was observed following the use of potassium bromid and tincture of belladonna. Quinin worked well in some cases when

¹ Jour. de Méd., June 25, 1897.

² Centraltbl. f. Bact., Sept. 15, 1897; Bull. Johns Hopkins Hospital, Apr., 1898.

³ Lancet, Jan. 15, 1898.

⁴ Ann. of Gyn. and Pediat., July, 1897.

⁵ Jahrb. f. Kinderh., Band xlii., Heft 3 and 4.

PLATE 4.

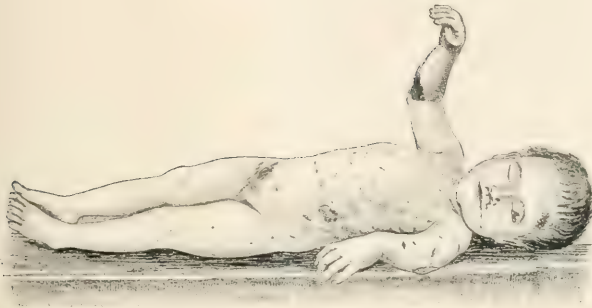
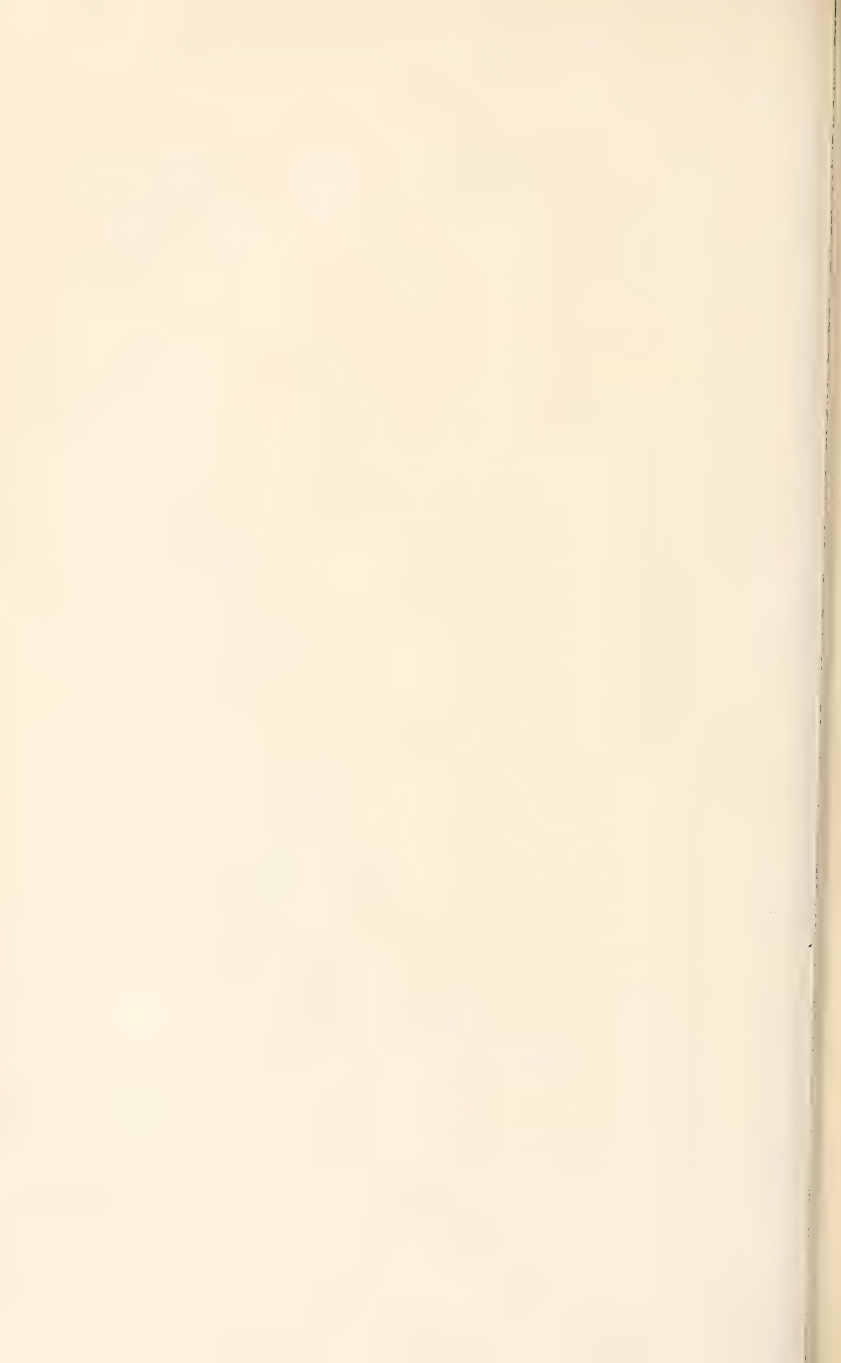


FIG. 1.—W. F. Lockwood's case of varicella gangrenosa.



FIG. 2.—Syphilis hæmorrhagica in an infant of three weeks: hemorrhagic vesicles; large nevus (Gottheil).



given in sufficient doses and for a long enough time. Small children refused to take it; and it acted unfavorably on the general condition of the patient, lessening the appetite. Much better results were obtained from the coal-tar products, of which phenacetin seemed to possess the least value and antipyrin the most. Bromoform acted better than any of the drugs, vomiting and other complications being almost unknown and the beneficial results being observed in from 48 to 72 hours. This was surpassed, however, in success by insufflation of resin of benzoïn, which gave marked improvement. It is advised to abandon the insufflation if no improvement follows after 4 or 5 days' use. A measure which would seem to commend itself in obstinate cases is described by A. de Miranda,¹ who states that **pressing the vagus at the neck** checks the vomiting in whooping-cough, and that compression of the superior laryngeal rapidly controls the paroxysms of coughing. This procedure is of more importance in the latter part of the disease. H. Naegeli² mentions as a valuable but old and nearly obsolete remedy, **coccionella**. Eighty cases treated with this were cured in from 6 to 8 days. A. H. Bigg³ reports a case which he treated with **biniodid of mercury**, giving $\frac{1}{100}$ gr. every 2 hours. The paroxysms were decidedly controlled by the fifth day. G. Koek has used with success a solution of quinoïn.

Tuberculosis.—R. F. Weir and E. M. Foote,⁴ in reporting experiences in renal surgery, said that tuberculosis **in both kidneys** is more commonly found in children under 12 years of age, most of the cases being secondary to tuberculosis elsewhere, although there are undoubted instances of primary infection. M. W. Ware⁵ has collected the records of 21 cases of infants inoculated with tuberculosis in the performance of the ritual of **circumcision**, the majority being infected by the sputum of tuberculous operators. The author states that the differential diagnosis of the local lesion from syphilis must be made by microscopic examination of a specimen from the diseased area. J. A. Hodges⁶ gives a thorough study of the symptoms and the differential diagnosis of **tuberculous meningitis**. D. Ssokolow⁷ gives an extensive report on the surgical treatment of tuberculous meningitis in children. He first proves that tuberculous meningitis is not always fatal, many undoubted cases of recovery having been reported. After a thorough review of the pathology, notes are given of all the reported cases in which operation was done. [While the results are not brilliant nor decidedly encouraging, yet neither are they so discouraging as to lead to the abandonment of the procedure.] G. W. Acker⁸ gives the clinical histories of 2 cases which he thinks he would have been justified in calling tuberculous meningitis, if recovery had not taken place. W. L. Stowell⁹ exhibited a 5-year-old boy who had presented symptoms of tuberculous meningitis, tubercle-bacilli being found in the fluid obtained by lumbar puncture. Potassium iodid and bromid were given and recovery ensued. R. Petit¹⁰ discusses **peritoneovaginal tuberculosis** in children and tuberculosis of the inguinal canal, or **hernial tuberculosis**. The author found that boys are affected more frequently than girls. The different pathologic lesions are described at length, as well as the symptoms. The treatment is mainly surgical. Monti¹¹ discusses the general subject of **tuberculous peritonitis**, with the following conclusions: 1. Tuberculous peritonitis with serous exudate can be cured by internal treat-

¹ Sem. méd., Oct. 20, 1897.

² Centralbl. f. Kinderh., 11 and 43, 1897.

³ Physician and Surgeon, Aug., 1897.

⁴ Med. News, Feb. 5, 1898.

⁵ N. Y. Med. Jour., Feb. 26, 1898.

⁶ Va. Med. Semi-monthly, No. 22, 1897.

⁷ Arch. f. Kinderh., Band xxiii., Heft 6.

⁸ Arch. of Pediatrics, Aug., 1897.

⁹ Ibid.

¹⁰ Rev. de la Tuberculose, Oct., 1897.

¹¹ Wien. klin. Woch., No. 42, 1897.

ment, though much less frequently and always more slowly than by laparotomy. 2. In such cases operation gives very good results, but relapses and subsequent outbreaks of tuberculous processes in other parts of the body are, nevertheless, not necessarily prevented. 3. In tuberculous peritonitis, with extensive adhesions of intestines or coincident swelling of the mesenteric glands, with which there is little fluid exudate, the results of operation are not satisfactory, and may lead to an unfortunate termination. 4. Experience up to the present is too slight to determine with certainty the value of laparotomy in the treatment of tuberculous peritonitis, except in cases with serous effusion and without extensive adhesions of the bowels or swelling of the mesenteric glands, in which good results may be expected.

J. W. Stickler¹ gives general directions for the management of children with an **inherited tuberculous diathesis**.

Rubella.—Peron² records 3 cases illustrating the **variations in the types** of the disease. The first patient was a son, 11 years old, who had typical eruption with enlargement of the postcervical glands, slight fever, sore throat, hoarseness, coryza, and cough, the illness lasting 3 days. Fourteen days later the father suffered from a severe attack resembling measles. Eighteen days after the son's attack the youngest child, aged 4, developed a mild attack of rubella. The diagnosis of rubella rather than rubeola, in the father's case, was based on the following points: The father had had measles in childhood; had not been exposed before his illness, except to rubella; the incubation-period was that of rubella; and the two members of the family who had rubella contracted measles, not from the father, but from another source, later in the year.

Vaccinia.—S. N. Copeman³ gives the natural history of vaccinia, and describes some interesting experiments by which eggs were used as a culture-medium, a bacillus thus being obtained similar to the one found in early vaccine-lymph. Lately this germ has been grown on agar-plates. Broth-cultures in the first experiment, when inoculated into calves, produced vaccinia, which could be carried on to other calves and subsequently to children. Later experiments were unsuccessful. W. Reed⁴ has confirmed L. Pfeiffer's observation that small **granular ameboid bodies** are present in the blood of vaccinated children and calves, and in the blood from cases of variola during the febrile stage. The nucleus has not been demonstrated in any of these bodies. They are also found in the blood of the monkey during the active stage of vaccination, disappearing with the decline of the local inflammation. Smaller bodies are occasionally seen in the normal blood of monkeys and children.

Beumer and Peiper,⁵ in investigating vaccine-immunity, were unable to find any effect following the use of **blood-serum or defibrinated blood** of vaccinated calves. They conclude that in the blood of these animals no bodies exist capable of conferring immunity upon other calves; or, if present, they are in such small quantities as to be powerless. Lucas⁶ refers to the excessive inflammatory reaction occurring in vaccination with calf-lymph. In some cases the reaction is very marked, with swelling of the arm, the axillary glands becoming enlarged and the pustules becoming confluent. Lucas finds that a free use of iodoform covered by dry antiseptic dressings will control the process promptly. [Such a complication is undoubtedly due to microorganisms which, under the old method, had free access. The new

¹ Jour. Am. Med. Assoc., Jan. 1, 1898.

² Rev. mens. des Mal. de l'Enfance, Oct., 1897.

³ Lancet, May 14, 1898.

⁴ Am. Medico-Surg. Bull., Dec. 10, 1897.

⁵ Berlin. klin. Woch., Arch. of Pediatrics, Nov., 1897.

⁶ Am. Jour. Med. Sci., Sept., 1897.

method of preserving the lymph in glass tubes will undoubtedly remove to a large extent the possibility of this complication.] R. W. Hastings¹ reports 2 cases of brothers who had **rashes appearing on the eighth day** after vaccination. In one case the rash consisted of a general punctate eruption with intense pruritus. On the back were large red patches, with some black spots. In addition to a general punctate appearance there was a general eruption of maculopapules, crescentic in form and grouping. On the face were some vesicles and pustules. In the other case the eruption was at first a diffuse erythema, becoming maculopapular later. The author thinks the cases were vaccine-rashes, and not measles. A. E. Bieser² reports 3 cases illustrating the fact that vaccination is not always a harmless process. The first case was one of **acute septicemia** following vaccination. Eight days after the operation the child was taken suddenly ill and died in 3 hours. The second case was one of **purpura** following vaccination; and the third case one of **localized vaccinia** on the vaccinated arm. The eruption, coming out in crops, appeared as papules, then vesicles with umbilication, then developing into pustules.

Mumps.—C. F. Craig³ reviews the **bacteriology** of mumps, and describes the diplobacillus which he found in the blood and the urine of a case occurring in a man. The bacillus could not be cultivated upon any ordinary media. It stains irregularly, the ends staining deeply, the center faintly; thus giving nearly the appearance of a diplococcus, for which the author thinks they have been mistaken by other observers. In addition the bacilli occur in pairs, hence the name diplobacillus. Beeigneul⁴ reports an epidemic of mumps affecting 63 adults, 16 of whom showed **metastasis to the genitals**. Atrophy of the testicle occurred in over two-thirds. When atrophy did not occur the testicle seemed distinctly softer than the unaffected one. Revilliod⁵ observed a **paralysis** after an attack of mumps, in which infantile and postdiphtheric paralysis could be excluded. The paralysis attacked first the lower and then the upper extremities, involving later the left side of the face and the muscles of deglutition and respiration. The sphincters and sensation were unimpaired. The case recovered in 6 weeks. Trachet⁶ recommends **an ointment** composed of ichthyol, lead iodid, and ammonium chlorid for mumps. Turpentine⁷ has been recommended as a specific in mumps.

Malaria.—H. B. Sheffield⁸ discusses intermittent fever in children, with special reference to its origin in New York. He concludes as follows: 1. Intermittent fever in children is mostly of the quotidian type; the chill and sweating-stage being often masked, it is not infrequently overlooked; the spleen is rarely enlarged if quinin is administered early. 2. Genuine intermittent fever always presents the malarial plasmodium in the blood; its absence is due either to a technical error on the part of the examiner or to the administration of drugs which are detrimental to it. 3. The existence of the varieties of plasmodium described by some authors as peculiar to quotidian, tertian, quartan, etc., types of the fever is still a subject of great controversy. 4. Infection of malaria is conveyed through the air as well as through water; the mosquito-theory of infection seems to be a mere hypothesis. 5. Malarial disease is endemic in most of the larger cities of the North, especially New York; all

¹ Ann. of Gyn. and Pediat., Mar., 1898.

² Yale Med. Jour., Apr., 1898.

³ Gaz. méd. de Nantes, Oct. 30; N. Y. Med. Jour., Nov. 27, 1897.

⁴ Rev. méd. de la Suisse Romande.

⁵ Jour. Am. Med. Assoc., Sept. 15, 1897.

⁶ Arch. of Pediatrics, Dec., 1897.

⁷ Am. Medico-Surg. Bull., Sept. 25, 1897.

⁸ N. Y. Med. Jour., Oct. 23, 1897.

doubts raised against it are not based upon scientific investigation. 6. Intermittent fever yields promptly to large doses of quinin, a point of considerable value in the diagnosis. Persistency of the attacks may be attributed either to the exhibition of quinin in too small quantities, for too brief a period, or to its administration in the form of the mercantile, heavily coated pill, which is, as a rule, insoluble, and hardly ever enters into the circulation. B. Robinson¹ gives as an important clue to the diagnosis of malaria in small children, a change in demeanor, from being bright and laughing and playing, to languor, quietness, and indifference. This condition will last for several hours and then gradually wear away, until the child seems in perfect health again. J. S. Billings, Jr.,² reports a case of malaria **in an infant 10 months old**. The blood was profoundly affected, the red corpuscles presenting poikilocytosis and schizocytosis; some of the red corpuscles were nucleated. The leukocytes numbered 18,500, the red corpuscles 1,381,000, and the hemoglobin was 25%. Recovery followed the use of quinin, the dose being 1 gr. every 4 hours.

Influenza.—M. L. Fuerst³ describes **influenza** as it occurs in children. He states that it has a characteristic course, beginning ordinarily with depression, low spirits, loss of appetite, and coryza. This lasts for about 10 days, and constitutes the incubation-period, when the symptoms become more easily recognized. The fever is atypical, with frequent chills; there is a cough, with hoarseness and dyspnea; deglutition is sometimes painful; the nasal catarrh increases, headache sometimes occurs; constipation is the rule; convulsions are often seen in very young children. If treated promptly at the beginning complications are avoided, and recovery is generally more rapid than in the adult. The most frequent complication is that of pneumonia, and the gastrointestinal and nervous forms are rather rare. The author has seen 4 cases complicated by infectious nephritis, 5 in which otitis media developed, and 1 case of mastoiditis. He considers salipyrin a specific for the disease, which is given in doses of 4 gr. 3 times a day for children under 5; 7 gr. for those between 5 and 10; and 15 gr. for those over 10. T. S. Westcott⁴ reports a case of influenza in a child 4 weeks old. Respirations became very shallow and cyanosis developed. There were frequent attacks of laryngeal spasm, with an increase of cyanosis, so that continuous medical attendance was necessary for 36 hours. Hypodermics of atropin $\frac{1}{5000}$ gr. seemed inefficient; oxygen-inhalations were given, tongue-traction used, hot and cold baths administered, and Schultz's method of artificial respiration tried; but the case grew progressively worse until antipyrin was used hypodermically in a dose of $\frac{1}{2}$ gr., when improvement set in and recovery ensued.

Epidemic Cerebrospinal Meningitis.—W. T. Councilman, F. B. Mallory, and J. H. Wright⁵ give an extensive report of 111 cases observed during the recent epidemic in Boston. The disease did not seem to spread by an active contagion, for the microorganism seemed to be restricted to certain localities. In some cases this may escape in a purulent discharge and may possibly exist as a saprophyte. The mortality of 111 cases was 68.5%. Of 35 postmortems diplococci were found in 31; and in 1 of the 4 cases in which they were absent, the fluid obtained by lumbar puncture during life was found to contain them. It is difficult to obtain cultures, the best medium being Löffler's blood-serum. The diplococci were also found in the polynuclear leukocytes of the meningeal exudate and nowhere else. Other organisms were

¹ Med. Rec., Jan. 15, 1898.

² Med. News, Oct. 16, 1897.

³ Rev. mens. des Mal. de l'Enfance, Jan., 1898.

⁴ Arch. of Pediatrics, Oct., 1897.

⁵ Am. Jour. Med. Sci., Mar. 18, 1898.

also present. The germ was only slightly virulent for rabbits and guinea-pigs, but killed a cat in 12 hours when inoculated upon the spinal meninges. Lumbar puncture was made in 55 cases, the diplococcus being found in 38. Early in the disease the fluid was clear, becoming turbid later. A few of the cases seemed to be benefited by the operation, and none seemed to be harmed by it. The cases dying early presented few lesions postmortem. In those dying later there were injection and opacity of the membranes and purulent exudate, most marked along the vessels and fissures. In the chronic cases the meninges were edematous and thickened, especially at the base; the brain and cord were softer and the surface of the ventricles was dull. The exudate was seen under the microscope to contain leukocytes and giant phagocytes; in the white matter of the brain there were foci of fine hemorrhages, and in 1 case a focus of acute purulent softening. The neuroglial cells were increased in the superficial layers of the cortex. Similar changes existed near the hemorrhages; the ganglion-cells were only slightly affected. There was frequently neuritis of the cranial and spinal nerves, and the ganglia were sometimes infiltrated with pus.

The spleen was only slightly enlarged; in 1 case there were hemorrhages in the skin; congestion of the lungs developed in 13 cases, and pneumonia due to pneumococci in 7, and in 8 pneumonia due to diplococci intracellularis. A. H. Wentworth¹ describes the clinical features of the disease, and divides them into: (a) foudroyant cases; (b) acute cases; (c) intermittent cases; (d) chronic cases; (e) mild cases. W. T. Councilman² gives a **historical review of the disease**, and describes in general the epidemic in Boston. He shows that the disease is one of early spring-time, the greatest number of cases appearing in April.

Other Infectious Diseases.—J. Friedman³ reports 2 cases of **trismus nascentium** in which the use of tetanus-antitoxin was followed by recovery. F. H. Dayus⁴ reports a case of tetanus, first noticed when the infant was 4 days old. Death occurred on the seventh day. F. A. Packard⁵ reports a case of tetanus in a boy 12 years old, in which recovery ensued without the use of antitoxin.

Z. Hirota⁶ describes the disease induced in sucklings by the milk of nursing-mothers suffering from **beri-beri**; 52 cases were observed, in 42 of which recovery followed a change of nourishment. The points of similarity between the disease in the mothers and the condition in the infants are: Increased action of the heart; accentuation of the second pulmonic sound; increased area of cardiac dullness on the right; dullness of the first sound at the apex; frequency and softness of the pulse; diastolic murmurs in the arteries; dyspnea, aphonia, vomiting in the majority of cases; cyanosis and edema, and diminution in the quantity of urine. The infants presented in addition occasional albumin-reaction in the urine, fretfulness or depression, and undisturbed consciousness without fever.

I. B. Diamond⁷ reports on 81 cases of **dengue**, of which 23 were in children. The disease ran a milder course in the children, and bore a close resemblance to typhoid fever.

Happe⁸ reports on **Asiatic cholera** in children, as seen in the Hamburg epidemic. There were 697 cases in infants under one year of age, with a mortality of 89.66%; 1701 cases occurred in children between 1 and 5 years of

¹ Boston M. and S. Jour., Mar. 17 and 24, 1898.

² Phila. Med. Jour., May 21, 1898.

³ Jour. Am. Med. Assoc., Oct. 9, 1897.

⁴ Brit. Med. Jour., June 4, 1898.

⁵ Arch. of Pediatrics, Feb., 1898.

⁶ Centralbl. f. innere Med., Apr. 23, 1898.

⁷ Med. News, Mar. 12, 1898.

⁸ Jahrb. f. Kinderh., Band xlii., Heft 34.

age, with a mortality of 75 %; between 5 and 15 years of age there were 1731, with a mortality of 45 %.

Shukowski¹ reports a case of **acute rheumatism** in a nursing-baby 2 months old.

Hereditary Syphilis.—I. A. Abt² reports a case in which the symptoms did not develop until the child was 5 years old. Fournier³ discusses the conditions under which it will be safe or unsafe to allow the child of a syphilitic father to be fed by a wet-nurse.

Coincidence of Infectious Diseases.—C. P. MacNabb⁴ reports a case of **whooping-cough** in a child, in the third week of which **typhoid fever** developed; in the third week of the typhoid the paroxysms, which had disappeared, returned, but disappeared again a few days later when croupous pneumonia developed. The crisis occurred on the fifth day, when the whooping-cough again returned to last for several weeks. A. J. Swallow⁵ observed a child, 3 years old, who presented a concurrence of **whooping-cough, scarlet fever, and varicella**. W. H. Price⁶ reports 2 children in the same family who showed a concurrence of **whooping-cough, chicken-pox, and mumps**.

GENERAL NONINFECTIOUS DISEASES.

Rachitis.—Mircoli⁷ supports the view that rachitis is of **infectious origin**. Injections of cultures of staphylococci into a young rabbit produced epiphysitis. When injections were made at the end of the first week of life and only small quantities were employed the only results were hypertrophy of the epiphyses, with chronic hyperemia of the cartilages. The portal of entrance of the infection in human beings is believed to be the mouth, and when the germs have once entered the circulation they are usually deposited in those organs that are most active—that is, the nervous system and the epiphyses, producing hydrocephalus and the characteristic changes in the bones.

V. Adriance⁸ believes that the **deficiency in proteids** is a considerable factor in the production of rickets; but he thinks that the general tendency in preparing formulae for infants is to increase the proteids too rapidly.

J. W. Troitzky⁹ gives an exhaustive review of the theories concerning the **etiology** of rickets. He states that ignorance of the exact cause of the disease leads to unwilling experiments to classify the disease as an infection, but that this theory is even more difficult to clear up. As a result of his experiments on animals he is forced to conclude that we cannot yet point with entire certainty to the exciting cause of rickets, and much less can we make clear the exact relationship between the conditions which favor its development and the anatomic changes in the bones. A. A. Kissel,¹⁰ in investigating the frequency of rickets in Moscow among children under 3 years of age, analyzes his **observations of 2530 children**, finding rickets in 80 %. The manifestations were usually mild, the disease affecting the rich as often as the poor. The diet seemed to exert no important influence. Many breast-fed children were found to be rachitic, although the mother was perfectly well and had an abundant supply of milk. The most frequent symptoms of rickets were seen in the formation of the rosary, in the widening of the cranium, in the enlargement

¹ Jahrb. f. Kinderh., Band xlii., Heft 34.

² Presse méd., Nov. 14, 1896.

³ Brit. Med. Jour., Mar. 19, 1898.

⁴ Deutsch. Arch. f. klin. Med., Band lx., Heft 1.

⁵ Arch. f. Kinderh., Band xxiii., Hefte 4 and 5.

⁶ Chicago Med. Recorder, Mar., 1898.

⁷ N. Y. Med. Jour., Feb. 19, 1898.

⁸ Phila. Med. Jour., June 18, 1898.

⁹ N. Y. Med. Jour., Apr. 30, 1898.

¹⁰ Ibid.

of the head, and in the paleness of the skin and mucous membranes. No decided case of rickets was found in the new-born.

Von Starck,¹ in analyzing records of postmortem examinations in children, found rachitis to exist in 31%. In 68% of these there was palpable **enlargement of the spleen**, but the degree of rachitic changes in the bones bore no constant relation to the splenic tumor. The author does not agree with Viorordt in believing that there is an interdependence between rachitis and splenic enlargement. He also thinks it is not justifiable to assume that rickets is an infectious process because the spleen is so often enlarged; but he considers this to be due not to the rickets, but to the gastrointestinal disorders which accompany rickets.

Fröblich² differs with Henoch, Comby, Baginsky, and others, for he thinks that the **adenopathies** seen in some cases of rickets are not integral parts of the clinical picture, but are due to some concurrent disease, such as tuberculosis, gastrointestinal disorders, etc.

G. Kamps³ finds that there is a marked tendency for **curvatures of the legs** in rickets to undergo spontaneous straightening. The process takes from 2 to 4 years, no improvement occurring after the child is 6 years old. The main line of treatment is to improve the general health. After the acute stage is over, being about on the legs will do good, no appliances being necessary. Osteotomy should be reserved for those curvatures which persist after the sixth year.

A. James⁴ reports a case of rickets beginning in a young man at the age of 17.

Brun and Renault⁵ report 6 cases of the condition known as **Møller-Barlow's disease**, or subperiosteal hematoma in rickets. The cases occur mainly in infants under 2 years of age, and the hemorrhage usually surrounds the femur. The condition seems distinct from either scurvy or acute rickets.

Scurvy.—D. J. M. Miller,⁶ in reporting a case of scurvy in a 10-months-old male child, who had been fed on oatmeal-gruel for 8 months, has collected 55 cases, only 14 of which were from dispensaries. F. M. Crandall⁷ also lays stress upon the greater frequency of the disease among the rich than among the poor. He also discusses the symptomatology at length. A committee to investigate scurvy made its report to the American Pediatric Association.⁸ Three of the committee (Griffith, Jennings, and Morse) conclude: 1. That the development of the disease in each case follows the prolonged employment of some diet unsuited to the individual child, and often a change, which at first thought would seem to be unsuitable, may be followed by a prompt recovery. 2. That in spite of this fact regarding individual cases, the combined report of collected cases makes it probable that in this group there were certain forms of diet which were particularly prone to be followed by a development of scurvy; first, in point of principle, here, are to be mentioned the various proprietary foods. 3. That in general the cases reported seem to indicate that the farther the food is removed in character from the natural food of the child, the more likely its use is to be followed by the development of scurvy. A minority report is made by A. Caillé, who states that: 1. From a study of this report and from due consideration of other known facts, scurvy appears to be a chronic ptomain-poisoning due to the absorption of toxins. 2. It follows

¹ Deutsch. Arch. f. klin. Med., Band lvii., S. 265.

² Jahrb. f. Kinderh.; Am. Medico-Surg. Bull., Mar. 25, 1898.

³ Bruns, Beiträge z. klin. Chir., Band xiv., S. 243.

⁴ Scottish M. and S. Jour., No. 1, 1897.

⁵ Presse méd., Jan. 12, 1898.

⁶ Arch. of Pediatrics, July, 1897.

⁷ Ibid.

⁸ Ibid., July, 1898.

the prolonged use of improper food, and abnormal intestinal fermentation is a predisposing factor. 3. Sterilizing, pasteurizing, or cooking of milk food is not *per se* responsible for the scurvy condition. 4. Changes of food and administration of fruit-juices and treatment of any underlying cause are a rational therapeutic procedure in scurvy. Cases of scurvy are reported by A. M. Jacobs,¹ G. S. Degrouette,² G. Lieber,³ Zuppinger,⁴ and C. Baron.⁵

Rheumatoid Arthritis.—T. K. Monroe⁶ reports a case in a boy 12 years old, with typical lesions.

Cretinism.—Mossé⁷ reported a case of congenital struma of the thyroid gland in a nursing infant cured by the administration of **thyroid extract** to the mother, who also had a goiter. The child was born with a goiter of considerable size. The treatment caused a disappearance of the child's goiter and a reduction in the size of the mother's. The child also improved remarkably in general condition. W. Sinkler⁸ reports a case of cretinism. The patient was 30 years of age, and resembled a child of 7 or 8 years as to height. Under the administration of thyroid extract improvement was marked, in 2½ years the increase in height being 7 cm.

In the *Lancet* (Oct. 2, 1897) there is an interesting group of cases reported by 4 observers. T. Telford-Smith reports a case in a girl, 17¾ years old, who grew in 2¼ years 7½ in., while taking thyroid tablets. An illustration shows the marked tendency of the bones of the leg to bowing, the rapid growth probably keeping them soft. H. E. Drake-Brockman gives the notes of a case occurring in a Hindu boy; the thyroid gland was much enlarged, but reduction in size was prompt and improvement was steady under thyroid extract. C. N. Anderson used thyroiodin in a cretin aged 11 years, and in a year all the symptoms had disappeared and the girl had grown 6 in. A. G. Paterson reports probably the most unusual illustration of the success of the thyroid treatment. The first child was a cretin, and the treatment was begun at 19 months, with immediate effect; it is still continued, and at the age of 5¾ years the boy is normal. Shortly after the treatment was begun the child's mother gave birth to a second cretin, which lived only 20 minutes. At the next pregnancy thyroid extract was given from the third month, and the mother was delivered at term of a healthy baby. Cases are also reported by D. L. Moore,⁹ J. S. White,¹⁰ and Bourneville.¹¹ Lanz¹² finds iodothylin to act better even than the fresh gland; and I. Bang¹³ found a lessening in the goiter of a breast-fed infant when the iodothylin was given to the mother; so he infers that it is excreted in the milk. C. Dukes¹⁴ and Hertoghe, who is quoted by Corput,¹⁵ have found the thyroid extract to be valuable in cases of infantilism or in backward children where the condition is not necessarily myxedematous.

Goiter.—F. Huber¹⁶ reports a case of goiter of rapid growth in a child 7 years old. Thyroid therapy caused the disappearance of the tumor.

Exophthalmic Goiter.—C. G. Kerley¹⁷ reports a case in a girl, 12 years old, apparently following traumatism. After the condition had lasted for a year, desiccated thyroid effected a cure in five months.

¹ Med. News, Jan. 15, 1898.

² Münch. med. Woch., Mar. 29, 1898.

³ Münch. med. Woch., May 3 and 10, 1898.

⁴ Phila. Med. Jour., May 7, 1898.

⁵ Columbus Med. Jour., Apr. 13, 1897.

⁶ L'Echo méd. du Nord, No. 3, 1897.

⁷ Wien. klin. Rundschau; Med. Rec., Apr. 2, 1898.

⁸ Acad. de méd. de Belge, Oct. 30, 1897.

¹⁷ Ibid.

² Med. Rec., Apr. 9, 1898.

⁴ Wien. klin. Woch., Apr. 28, 1898.

⁶ Glasgow Med. Jour., Feb., 1898.

⁸ Ibid., June 4, 1898.

¹⁰ Med. Age, No. 9, 1897.

¹² Therap. Woch., No. 11, 1897.

¹⁴ Brit. Med. Jour., Mar. 5, 1898.

¹⁶ Arch. of Pediatrics, Dec., 1897.

Thymus Gland.—Dolinsky¹ reports a case of sudden death in a newborn child, the autopsy revealing a thymus gland which measured $3\frac{1}{2}$ in. long, 3 broad, and 1 thick. Clark² reports the case of a boy, 8 months old, who had been in good health up to 6 months of age. Then the hands and feet began to swell, the edema finally becoming general, with a waxy appearance of the skin. There was no cyanosis, and the lungs, heart, eyes, and urine were normal. Tonics and diuretics had no effect. Two ecchymotic areas appeared on the shoulders, death occurring after 2 months' illness. At the autopsy there were left-sided hydronephrosis and entire absence of the thymus gland.

Hypertrophy of the Thymus.—Siegel³ gives the clinical notes of a child, $2\frac{1}{2}$ years old, in whom an asthmatic condition developed, passing into permanent dyspnea. Tracheotomy, with the introduction of a cannula reaching to the bifurcation, afforded no relief. The mediastinal space was then opened, and the thymus was seen to protrude with each respiration. The breathing became quiet at once and the child seemed cured in 5 weeks. Koenig⁴ describes a case of severe dyspnea in an infant who had a cystic tumor at the base of the tongue; puncture of this did not improve the breathing. A tumor was then felt over the sternum, so an incision was made down to this, which proved to be the hypertrophied thymus. On raising this the dyspnea was relieved, so a section, three by two cm., was excised, and the severe dyspnea was relieved. W. Schleif⁵ reports the case of an infant dying of asphyxia when one day old, postmortem examination revealing a thymus which weighed 10.7 gm., and measured 5 cm. in width and $3\frac{1}{2}$ cm. long.

Cases of **diabetes mellitus** in young children are reported by W. G. Murphy,⁶ whose patient, a boy of $4\frac{1}{2}$ years, was much improved by treatment and diet; but death in coma followed neglect of diet by the parents; and by Dreyer,⁷ whose patient was under 2 years of age, the fourth on record at this age. Death occurred in 12 days after the condition was recognized.

DISEASES OF THE ALIMENTARY TRACT.

J. P. C. Griffith⁸ reports the case of a boy, 21 months old, in whom there was cough, with frequent croup-like attacks. The case resembled mainly stenosis of the trachea. Tracheotomy gave no relief; but at the postmortem an extensive **retroesophageal abscess** was found associated with caries of the thoracic vertebrae.

Congenital Stenosis of the Pylorus.—H. D. Rolliston and L. B. Hayne⁹ detail an interesting case of an infant who died at the age of 8 weeks. The stomach was the only abnormal organ, showing a slight dilatation, the pylorus being large and thickened. Its lumen admitted a No. 4 male catheter. Microscopically both muscular coats were hypertrophied; the circular ones more so. The literature is reviewed, 17 cases being collected. H. Ashby¹⁰ reports 2 cases and also reviews the literature. He mentions the fact that in some cases there is no obstruction at the pylorus, although the muscular walls are much hypertrophied. J. G. Thomas's theory of the etiology is that the trouble lies in the nervous mechanism which regulates contraction and relaxa-

¹ Arch. of Pediatrics, Aug., 1897.

² Ibid.

³ Univ. Med. Mag., July, 1897.

⁴ Deutsch. med. Woch., No. 37, 1897.

⁵ Brit. Med. Jour., Apr. 23, 1898.

⁶ Jahrb. f. Kinderh., Band xlv. Hefte 3 and 4.

⁷ Deutsch. med. Zeitung, No. 27, 1897.

⁸ Albany Med. Ann., July, 1897.

⁹ Arch. of Pediatrics, Jan., 1898.

¹⁰ Arch. of Pediatrics, July, 1897.

tion of the pylorus under appropriate stimulation. Finkelstein¹ reports a case in a girl-infant, the muscularis mucosa being the coat mainly thickened. The successive steps seemed to be congenital stenosis, stagnation of stomach-con-



FIG. 55.—Stomach, showing ulcers and pseudomembranous exudation (Wollstein, in Arch. of Pediat.).

tents, catarrhal gastritis, increasing the stenosis; atony, and dilatation of the stomach. The author collected 10 cases from the literature.

Cases of **ulcerative gastritis** are reported by M. Wollstein² and by

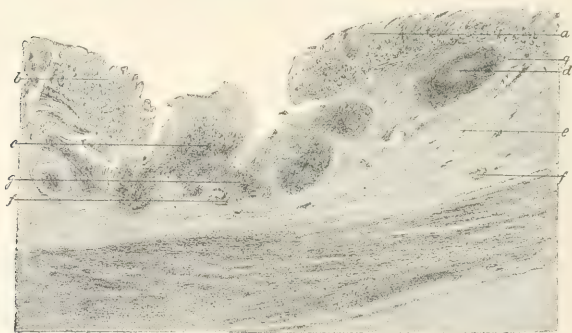


FIG. 56.—M. Wollstein's case of ulcerative gastritis. Section through one of the larger ulcerated areas: *a*, necrotic area in glandular layer; *b*, gastric glands; *c*, necrotic plug in center of ulcer; *d*, necrotic mass in submucosa, encroaching upon muscularis mucosae and glandular layer; *e*, submucosa, infiltrated and edematous; *f*, blood-vessels surrounded by leukocytes; *g*, muscularis mucosae (Arch. of Pediat.).

C. M. Hibbard.³ Colrat and Cadet⁴ report the case of an infant, 2 months old, in which diarrhea and vomiting had lasted for 4 weeks. At the autopsy an **ulcer** was found **near the pylorus**, having penetrated the wall of the

¹ Jahrb. f. Kinderh., Band xliii., Heft 1.

³ Boston M. and S. Jour., vol. cxxxvii., No. 7.

² Arch. of Pediatrics, Oct., 1897.

⁴ Bull. m d., p. 1123, 1897.

stomach and caused a localized abscess. A. Cade¹ reviews this subject in reporting a case, also in an infant 2 months old; and he finds that while the condition is rare in infants, even nurslings may have it; in its anatomic characters, its seat, and complications, it is like the gastric ulcer of adults; its etiology is obscure.

J. Comby² discusses the **digestive fevers of children**. The main cause, he states, is error in diet. The symptoms are undefined, with pallor, loss of appetite and of energy. There is some fever at night, sleep is disturbed, the tongue is coated, and there is often constipation. If the condition is recognized early the prognosis is good. The essential part of the treatment is careful regulation of diet; and the medicinal treatment consists mainly in the use of digestives and antiseptics.

E. Mueller and Manicardi³ examined the spinal cords and brains of 7 infants that had died of **gastrointestinal disorders**. They found irregularity of the cells of the chromophilic bodies, distortion of the cells, fragmentation of the processes, displacement of the nucleus and nucleolus. They consider these changes to be the result of toxic influences, as they bore no relation to the degree of fever.

R. H. Russel⁴ reports a case of **cystic dilatation of the common bile-duct** in a child 8 years old. The condition was a rather acute one, 2 cystic tumors being felt in connection with the liver, 1 of which was considered to be an hydatid cyst. At the operation one of the tumors was found to be the distended gall-bladder and the other the common bile-duct. The authors consider the condition to have been congenital, a slight catarrhal inflammation having increased the tension of the cyst.

J. N. Clark⁵ reports 2 cases of **congenital syphilitic cirrhosis of the liver**, one in a child 10 years old, the other in an infant 1 month old.

W. F. Cheney⁶ reports **echinococcus-cyst of the liver** in an Italian boy, 7 years old, in San Francisco. There were no general symptoms, but the mother had noticed a swelling in the boy's right side which had existed for 2 years. The swelling was evidently a cystic tumor, and fluid withdrawn by a hypodermic needle showed many pus-cells, but no hooklets or hydatids. Hydatid thrill was also absent. At the operation two large hydatid cysts were emptied, the lower one, which had been aspirated, having begun to suppurate.

A. Jacobi⁷ reports a case of **Jacksonian epilepsy** in a girl 11 years old, in whom there developed acute ascites. The fluid contained tubercle-bacilli. At the autopsy the liver was found to contain many small, light-yellow nodules, closely resembling miliary tubercles; but on microscopic examination they were found to be miliary adenomata. There was no lesion of the brain to account for the epilepsy.

Dallemagne and Tordens⁸ report a case of **hypertrophic cirrhosis of the liver**, with icterus, in a boy 9 years of age. The illness began by vomiting, accompanied by fever, jaundice, and enlargement of the liver and spleen; 18 months later the liver had decreased somewhat in size, and a small quantity of fluid was present in the abdominal cavity.

Lesage and Demelin⁹ discuss the **simple icterus of the new-born**, which they consider is of hematogenous origin, chiefly because the stools con-

¹ Rev. mens. de Mal. de l'Enfance, No. 2, 1898.

² Deutsch. med. Woch., Mar. 3, 1898.

³ Am. Jour. Med. Sci., Apr., 1898.

⁴ Ibid., Jan., 1898.

⁵ Méd. mod., Feb. 16, 1898.

⁶ Ann. of Surg., Dec., 1897.

⁷ Arch. of Pediatrics, Nov., 1897.

⁸ Ibid.

⁹ Rev. de Méd., Jan. 10, 1898.

tain bile and there is no biliary pigment in the urine, which, however, contains hematoidin. The infectious icterus of hepatogenous origin may arise from infection through the umbilicus or from the intestines, the infection travelling up the bile-duct. They report 7 cases seen by themselves in which bacteriologic examination showed large numbers of colon-bacilli. They consider that the infection in this disease, in Winckel's disease, and in infectious enteritis is the same. The only clinical distinction from Winckel's disease is the presence of hematuria, which is the result of greater severity of the renal lesion. Infection through the umbilicus can be recognized from the enteric form by the intense fever, the metastatic processes, and the local condition.

J. C. Warren¹ reports the case of a boy with symptoms of chronic **appendicitis**. Operation showed a round-cell sarcoma of the appendix, with involvement of the mesenteric glands; the cecum, a portion of the ileum, and a V-shaped piece of mesentery were removed and the patient recovered. T. R. Savage² reports a case of perforating appendicitis in an infant, following numerous attempts to reduce a strangulated inguinal hernia of the colon. H. A. Hare³ reports 7 cases of appendicitis, 2 of which were in boys of 10; one had had 9 attacks in 6 months. An operation was advised, but it was refused, and the boy died.

E. Libman⁴ observed 2 cases of **acute gastroenteritis**, the passages containing large numbers of Hirsch's streptococcus. In the fatal case the blood before death was found to contain streptococci. Injections of portions of the stools into mice proved fatal, the germs being recovered from the blood and from the stools. Pure cultures were obtained from the tissues of the mice. The blood-serum from the child that recovered showed no antitoxic or bactericidal action.

Hutinel⁵ discusses the **treatment of chronic diarrhea** in infants.

F. Bryant⁶ gives as the main cause of hemorrhage from the bowel in children the existence of **rectal polypi**, which may give rise to straining, ulceration, prolapse of the rectum, and even intussusception.

J. F. Erdman⁷ reports a case of **intussusception** in a boy 9 years old, due to inversion of Meckel's diverticulum.

D. E. Walker⁸ reports a case of **phantom tumor** in a girl aged 11 years. On rectal examination a swelling the size of a 4 months' gravid uterus could be felt in the pelvis. It was tympanitic and disappeared after the administration of asafetida.

T. C. Martin⁹ gives as a reason for **constipation in infants** and their straining at stool, the imperfect development of the anatomic structures in the mechanism of expulsion. The muscular coat of the large intestine is not completely developed, and the relatively long peritoneal attachment allows greater mobility of the bowel and interferes also with expulsion.

F. Treves¹⁰ reports a case of **idiopathic dilatation of the colon** in a girl 5½ years old. An artificial anus not relieving the condition, he removed at a second operation the descending colon, sigmoid flexure, and rectum, suturing the transverse colon to the site of the original anus. Recovery was prompt. The cause of the dilatation was congenital narrowing of the lower 12 in. of the bowel, which was a straight, narrow tube. W. Osler¹¹ described 4 cases. C. F. Martin¹² discusses the causes, diagnosis, prognosis, and treatment of the

¹ Boston M. and S. Jour., Feb. 24, 1898.

² Med. News, Mar. 12, 1898.

³ Méd. mod., Dec. 1, 1898.

⁴ N. Y. Med. Jour., Apr. 16, 1898.

⁵ Jour. Am. Med. Assoc., Feb. 19, 1898.

⁶ Arch. of Pediatrics, May, 1898.

⁷ Med. Rec., Apr. 23, 1898.

⁸ Med. Rec., Mar. 5, 1898.

⁹ Lancet, Apr. 2, 1898.

¹⁰ Ibid., Mar. 12, 1898.

¹¹ Lancet, Jan. 29, 1898.

¹² Montreal Med. Jour., No. 9, 1897.

condition. He divides them into 4 groups: 1. Those in which the symptoms occur at birth, either as constipation alone or combined with distention of the abdomen. 2. Those in which the symptoms develop shortly after birth. 3. Those developing after several years and associated with no pathologic lesion. 4. Those occurring in adult life.

E. R. Kirby¹ discusses **congenital malformations of the rectum**, and reports a case in which the anal aperture led into a blind pouch.

H. A. Johnston² gives as the essential points in treating the **postdiarrheal anemias**: 1. Regulation of the diet. 2. Administration of an assimilable form of iron.

W. R. Jordan³ reported an **excessive flow of saliva** in two boys who came under his notice. The salivation continued even during sleep, and in the absence of any discoverable lesion the author is disposed to consider the condition dependent on some reflex excitation of the nervous system. One case died of diphtheria shortly after coming under observation. In the other case belladonna checked the flow for a time, but the dose had to be increased until 20 minims of the tincture were given three times a day, and then this lost its effect.

Braquehay and Sabrazes⁴ report the case of an infant who was noticed, a few days after birth, to be nursing badly. A small, **bilateral tumor** was then noticed **at the base of the tongue**. As this tumor grew in size and interfered with the act of suckling it was removed, some time later, when the child was decidedly athreptic. Three months after the operation he was still living, but had not gained in weight.

It will, perhaps, not be out of place to refer here to Ponfick's⁵ communications on the influence of **middle-ear inflammation** in producing various infections in children. He was led to investigate the subject by the cases of his own children, who had digestive disturbances which were uninfluenced by regulation of diet until a previously unrecognized suppuration in the middle ear was treated. The author then examined the ears in 100 postmortems in children; 6 of them having died of a noninfectious disease, 75 of an acute infection, and 19 of a chronic infection. In 9 cases only was the middle ear on each side free from purulent inflammation. Such a focus can infect the system in three ways: 1, by direct absorption of toxins; 2, by spread of the germs to the lungs; 3, or to the digestive tract.

W. Knoepfelmacher⁶ proceeded to investigate the **digestion of casein** by infants, by determining the amount of phosphorus in the stools. In casein the normal amount of N to P is 18.4 to 1, and in the derivatives of casein still less. In meconium the relation of N to P is 260 to 1; and in the feces of breast-fed children it is about the same, so that children thus nourished lose practically no phosphorus, casein-digestion being complete. In the stools of children fed on cow's milk the relation is 16.4 to 1, so that this large amount of P must come from undigested casein-derivatives. Cow's milk, in such concentration that its P equals that of mother's milk, is indigestible, and when diluted so that the casein equals that of mother's milk, the amount of P is below normal, and also that of iron. The author directs that to supply these deficiencies, egg-albumin and egg-yolk should be added to diluted milk.

D. J. M. Miller⁷ thinks that many cases of gastrointestinal troubles in young children are due to the too early use of the **farinacea** in the diet. He

¹ Arch. of Pediatrics, Aug., 1897.

² Ibid.

³ Birmingham Med. Rev., Sept., 1897.

⁴ Rev. mens. des Mal. de l'Enfance, Sept., 1897.

⁵ Berlin. klin. Woch., Nos. 38-41, 1897.

⁶ Wien. klin. Woch., Jan. 27, 1898.

⁷ Arch. of Pediatrics, Apr., 1898.

maintains that bread, potatoes, oatmeal-porridge, and undiluted milk should not be given, as a rule, before the twentieth or twenty-fourth month; and if they are not well digested then, a dry malt-extract may be given.

The capacity of the stomach in infants was studied in Escherich's¹ clinic, and it was found that infants who were breast-fed had a smaller capacity than those artificially fed; healthy stomachs are smaller than those that are either functionally or anatomically morbid; small stomachs have greater elasticity than larger ones; the size of the pylorus influences the capacity of the stomach, the smaller the pylorus the larger the stomach. Systematic lavage is injurious, as it produces a temporary gastroparesis which may become permanent. The maximal amounts allowed at one time to a normally developed infant are, at the age of 1 month, 90 c.c.; 2 months, 100; 3, 110; 4, 125; 5, 140; 6, 160; 7, 180; 8, 200; 9, 225; 10, 250; 11, 275; 12, 290. [If the observer has made any error it is on the safe side, for we have seen a number of otherwise suitable dietaries fail merely because the amount given at each feeding was too large.] J. Comby² has also investigated this subject, and arrives at nearly identical figures for the first 6 months of life. [The variation after this time (his figures for a child one year old being 220 c.c.) is only to be expected, as individuality becomes more marked and other causes, such as general health and care, exert their influences.] Of 82 autopsies dilatation of the stomach was found in 80%.

H. A. Dumat³ discusses the **persistent vomiting** of infants, which he thinks is the result of a gastric catarrh set up by irritant ptomaines formed by microbes ingested with the food. He objects to the use of gastric sedatives, antacids, and counterirritants before all the irritant contents are removed. This is easily accomplished by means of a lactic-acid solution (lactic acid, Miv ; glycerin, 5j ; water, 5iv). The thirst renders it easy to give this to the infant, but it will soon be vomited with considerable mucus. This is repeated, at intervals of an hour, for several times, until the third or fourth dose is retained, when bismuth may be begun.

Hermans⁴ gives the line of treatment to be followed in grave cases of **melæna neonatorum**, there being 3 objects to be accomplished: To act on the skin in order to stimulate its circulation and the nerve-centers; to sustain the vital forces by alimentation; and to excite the gastrointestinal vasoconstrictors. The first object is met by friction, warm baths, and uniform warmth (incubator or cotton-wool); cold drinks, ice, ergotin, and astringents accomplish the last. If collapse develops, oxygen-inhalations, counterirritation, and hypodermoclysis of normal salt solution must be used. Ovi⁵ agrees with all of this except the internal medication, which he says does no good; but L. D. Gamble⁶ reports a seemingly fatal case where the hemorrhage was only controlled by $\frac{1}{2}$ dram of the liq. fer. perchlor. in 1 dram of water.

Orlowski⁷ discusses the general subject of **hemorrhages in the newborn**, and states that they are more frequent than statistics would indicate. Umbilical hemorrhages are the most frequent, then melæna, and then hematemesis. The 2 great causes are infection and syphilis. The infectious agents, in the order of their frequency, are streptococci, staphylococci, and colon-bacilli, and these germs cause hemorrhage in robust infants free from hereditary taint

¹ Wien. klin. Woch., Nov. 4, 1897; Jour. Am. Med. Assoc., Jan. 15, 1898.

² Presse méd., June 26, 1897.

³ So. African Med. Jour., Aug., 1897; N. Y. Med. Jour., Sept. 25, 1897.

⁴ Rev. internat. de Méd. et de Chir., vol. vii., No. 22.

⁵ N. Am. Pract., Nov., 1897.

⁶ Brit. Med. Jour., July 24, 1897.

⁷ Méd. mod., Aug. 25, 1897.

as well as in the debilitated or syphilitic. The great portal of entrance is the umbilicus, when improperly ligated. 85% is the usual mortality.

W. S. Fenwick¹ describes, as a rare condition in England, **paroxysmal hyperacidity** in children, simulating migraine. It is most common between the ages of 4 and 10 years, occurring in children otherwise healthy. Mental and physical fatigue and overindulgence in sweets seem to be the determining causes. The onset is usually sudden, but sometimes there is malaise for a day or two. The headache soon becomes diffuse, with tenderness of the scalp; movement increases the pain, and there is often a sharp cry, as in meningitis. In an hour or two a burning pain is felt in the epigastrium, associated with flatulence and pyrosis. With the vomiting of a fluid which burns the pharynx the headache sometimes subsides and the child falls asleep; but often the retching continues for hours, and convalescence is not complete for several days. The temperature, usually subnormal, is occasionally a little elevated. The pulse is small and sometimes slow; the appetite is lost and there is constipation. The disease can only be distinguished from migraine by chemical examination of the vomitus. During the attack the patient must rest in bed in a darkened room, and an emetic of ipecac or a glass of warm water may sometimes abort it. Phenacetin or antipyrin is sometimes useful. The stomach may be washed out by copious draughts of water containing sodium bicarbonate; lavage with a stomach-tube is not necessary. General hygienic measures are to be adopted in the interval between attacks; the most successful medicinal treatment is the use of potassium bromid combined with liquor potassæ.

J. Thomson² reports the case of an infant which became jaundiced on the second day after birth, and died on the twentieth day. The urine was brown; the stools yellow and then green, but never clay-colored: the first passages were not ordinary meconium, but an ochre-like material. Microscopic examination of the liver showed beginning cirrhosis and fatty infiltration. The gall-bladder contained 1 gall-stone weighing 25 mg. and fragments weighing 5 mg. Chemically they were found to contain biliverdin and cholesterolin. The author has collected 6 other cases of **gall-stones in new-born infants**, all of whom died.

T. Krasnobajef³ gives the notes of a case of **sarcoma of the liver** in a child 1½ years old. The physical signs suggested a subphrenic abscess, but on incision a softened sarcoma-nodule was found, the autopsy revealing several others. Microscopically it was a large round-cell sarcoma.

C. M. Powell⁴ reports the case of a girl of 6 years taken sick with typhoid fever, following which the liver was much enlarged (to within 2½ in. of the umbilicus), but atrophying rapidly within a month, death occurring with symptoms of **acute yellow atrophy**. At the postmortem examination the liver was small (15 oz.), and on section showed numerous tawny-yellow nodules. A. A. Kanthack reported the cirrhosis to be of the lobular and intercellular type.

Cozzolino⁵ investigated 8 cases of **cholera infantum** with regard to the etiology, concluding that the stomach-contents do not furnish any accurate information with regard to it, and that the infection is not carried by the blood.

W. E. Darnall⁶ describes the clinical **significance of the discharges** in infantile diarrhea, making 4 groups: 1, mucous stools, from the large intestine; 2, serous stools, as in cholera infantum; 3, pasty, white or musty stools,

¹ Lancet, Jan. 3, 1898.

² Edinb. Hosp. Rep., vol. v.; Brit. Med. Jour., May 28, 1898.

³ Djetsk. Med., No. 1, 1897.

⁴ Brit. Med. Jour., Oct. 16, 1897.

⁵ Arch. of Pediatrics, Nov., 1897.

⁶ N. Y. Med. Jour., July 17, 1897.

due to glandular atony and deficiency in bile; 4, dyspeptic stools: (a) acid, leaden-white stools of starch-feeding, (b) alkaline, green stools of proteid-feeding, both being due to microorganisms.

A. Seibert,¹ in an article on the prevention and **treatment of gastro-enteritis** in children, deplors the fact that while the infectious origin is universally recognized, yet physicians lose sight of it in the treatment that is ordinarily prescribed, giving opium and bismuth too early and returning to milk in the diet before it is safe. In the prevention, pasteurization of milk is not considered adequate, and in the great majority of families time and patience are wanting for this procedure, while simple boiling is easily done and is more efficient. With regard to the modified-milk laboratories, the cost of the product will limit its use to the wealthy classes, while the author doubts its nutrient value. "This modification of cow's milk, to my mind, oversteps the line, for in the subtlety of its composition the product surpasses human milk and the laboratory the breast of the mother. The proportions of fat, casein, albumin, sugar, and water are not alone subject to daily, but even hourly, changes in the mother's milk. This change may be of as important value to the infant as the change of diet to the adult. Cow's milk, modified by approximate dilution, changes at least from day to day, and no doubt no two bottles contain, for instance, the same amount of fat. In laboratory-milk all the constituents remain the same from one feeding to another, from day to day, from week to week, until the supervising physician sees fit to write another prescription. We find the same fault in all commercial infant-foods, and for this reason the milk-laboratory appears to me a forward step in the wrong direction. Such infant-feeding is certainly not 'crude;' on the contrary, it is even more than artificial—it is artistic." The author further objects to the distribution of pasteurized milk at low prices to the poor, who thereby do not realize the importance of cleanliness. He considers a frequent source of gastro-intestinal infection in early life to be the careless treatment of the infant's mouth after birth, by the unclean finger of the accoucheur, etc.

F. J. Bowles² used **lactic acid** in a maximum dose of 1½ gr. every hour in 60 cases of summer-diarrhea, and found it to control the symptoms in every case in from 24 to 48 hours.

L. Guinon³ discusses the forms and treatment of **colitis** in children, preferring the term "colitis" to those used by the Germans, "follicular enteritis" and "catarrhal enteritis," the former being faulty in suggesting the lymph-follicles, while the main symptom is the formation of mucus, which these follicles cannot excrete, and the latter conveys the idea of a superficial affection. He divides colitis into two main groups, acute and chronic. The acute varieties are the catarrhal (or mucous), which may be severe, light, or localized; and the dysenteric. The chronic varieties are the mucomembranous of 3 types, continued, indolent, and enteralgic; and the paroxysmal, which may be simple or resemble dysentery. In the treatment special stress is laid on the value of irrigations.

With regard to the use of **opium in diarrheal diseases**, F. M. Crandall⁴ gives the following contraindications to its use: 1. In the early stages of an acute attack, before the intestinal tract is cleansed. 2. When the passages are infrequent and of bad odor. 3. When there are high fever or cerebral symptoms. 4. When its use is followed by an increase of temperature or by more offensive passages. It is indicated: 1. In cases with frequent painful passages. 2. When the discharges are large and watery. 3. In dyspeptic

¹ N. Y. Med. Jour., Mar. 12, 1898.

² Indian Lancet; Med. Brief, Aug., 1897.

³ Gaz. hebdom. de Méd. et de Chir., Apr. 3, 1898.

⁴ Arch. of Pediatrics, May, 1897.

diarrhea, when it is to be given with a purge. 4. In the late stages of a diarrhea, when the discharges are small, frequent, and nagging. 5. When there is lientery, the food passing undigested soon after ingestion.

Infantile constipation is due, J. W. Byers¹ thinks, to unassimilated fat rather than to casein, and the proper treatment is similar to that of rickets, the main dependence being upon cod-liver oil, which acts, not by increasing the fat in the stools, but by raising the nutrition of the child to the norm.

J. D. Graham² urges the value of **hot water**, both internally and externally, in acute diarrheal conditions.

Loïn³ reports marked success following **hypodermoclysis** with normal salt solution in cases of cholera infantum which had resisted all other treatment.

F. M. Crandall⁴ discusses the **diet in febrile diseases** of children, and thinks that the general tendency is to give too frequent, too much, and too rich feeding. Careful records of the exact amount of food taken and retained should be kept in each case.

Tape-worm in children is treated of by L. Ogilvie,⁵ who has seen a case in a child of 3, following the administration of raw-beef juice during an acute illness. [In a case recently under observation, a boy of 20 months, there was a similar history. It is stated that straining the beef-juice through a piece of muslin frees it from the embryos.] The author urges larger doses of the liquid extract of male fern than are usually given, the small doses of $\mathfrak{M}\mathfrak{xv}$ being not only inadequate, but more liable to produce toxic symptoms. The importance is urged of the preparation of the patient as regards diet before the treatment. For several days less should be eaten than usual, and then a milk-diet given for 1 day, on the evening of which a purgative draught of jalap and magnesium sulphate is given, to be repeated the next morning at 7 o'clock. At 8 o'clock half of the following mixture should be taken, and the remainder at 9 o'clock: *R. Ext. filicis liquidi, ʒ ½; mucilag. acaciæ, ʒij; mist. amygdalis, q. s. ad ʒij.* Two hours later a dose of castor oil and jalap should be given, even if the entire worm has been expelled, as it is necessary to remove the vermifuge from the bowels.

DISEASES OF THE RESPIRATORY SYSTEM.

P. Gastow⁶ describes the **spastic night-cough**, with vomiting and coryza, in young children. The cough resembles pertussis in the paroxysms and in causing vomiting. It occurs only in very young children, who do not expectorate, and it is caused by a posterior rhinitis, the discharge dropping back into the pharynx and producing a reflex cough, which is spasmodic because the mucus collects near the vocal cords, causing spasm of the glottis. It occurs at night because the position of the head favors gravitation of the mucus to the pharynx and larynx. The author gives as treatment the local application of borovaselín.

M. C. O'Toole⁷ has seen many cases of **adenoid vegetations** occurring in children whose mothers had leukorrhea, and he believes that infection with secretions which contain gonococci may cause these growths. J. F. McCaw⁸ reports 3 cases in which the adenoids were associated with unusual symptoms. In one there was frequent bronchial irritation and inflammation, with impair-

¹ Jour. Am. Med. Assoc., Dec. 11, 1897.

² Ann. of Gyn. and Pediat., May, 1898.

³ Sem. méd., No. 146; Brit. Med. Jour., Mar. 20, 1898.

⁴ Arch. of Pediatrics, Jan., 1898.

⁵ Med. Brief, Dec., 1897.

⁶ Der Kinderarzt; Med. Rev., May 14, 1898.

⁷ Jour. Am. Med. Assoc., Mar. 5, 1898.

⁸ N. Y. Med. Jour., April 30, 1898.

ment of health; in another the breathing was so difficult as to necessitate constant watching during sleep; and in the third there were nervous symptoms, with mental dulness and muscular twitchings. All were relieved by operation. The author thinks that the embryologic relationship between the pituitary body and the pharynx may explain the reflex disturbances seen in cases of adenoid disease. Eustace Smith¹ reports a case in which removal of postnasal adenoid vegetations in an infant was followed by cessation of attacks of laryngeal stridor or congenital crowing. He thinks [justly] that this confirms his view of the etiology of the attacks. C. H. Hunter² reports 2 cases of laryngismus stridulus occurring in a boy, 19 months old, and his sister, 7 months old. The first attack in each case proved fatal, there being no relaxation, and therefore no crowing-inspiration. Nothing abnormal was found in either case except marked signs of rickets.

Soca³ reports 4 cases of what he calls stridulous laryngitis, in which the symptoms of obstruction lasted from 9 days in one to 46 days in another of the cases. He thinks that the stenosis may be in some cases the only symptom of laryngismus stridulus.

Demelin⁴ has observed 22 cases of **bronchopulmonary hemorrhage** in the new-born, and he finds that it may occur from thoracic compression during labor or from congenital weakness of the vessel-walls. The most prominent symptoms are cyanosis, with bleeding at the mouth and nose, slow respiration, and sometimes edema of the feet. Death usually occurs in a few hours. The cyanosis is the feature which distinguishes bronchopulmonary from gastric bleeding. At the postmortem, however, blood is often found in the alimentary tract; but the absence of lesions of the mucosa shows its pulmonary origin. When there is time for treatment it is usually ineffectual.

Sotéroff⁵ gives the treatment for bronchiectasis in children, which must be prompt, in order to avoid, if possible, permanent organic changes in the lungs.

An editorial⁶ quotes B. Richardson and H. Hall as opposing the use of steam-inhalations and hot poultices in the treatment of bronchopneumonia. Baths of about 20° C. for 5 minutes at a time are said to be used with benefit, while Desmours⁷ advocates the warm bath recommended by Lemoine.

W. L. Stowell⁸ also advises against the use of **poultices** in bronchopneumonia; but says that light ones are useful in the early stage of a bronchitis.

S. West⁹ discusses at length the **etiology of bronchopneumonia**, and concludes: 1, that the primary and secondary bronchopneumonias have a different pathologic origin; 2, that secondary bronchopneumonia is, for the most part, due to streptococcal infection derived from some source in connection with the air-tubes, throat, or mouth; 3, that primary bronchopneumonia is of pneumococcal origin; 4, that pneumococcal infection occurs with almost equal frequency in the child and adult; 5, that pneumococcal infection takes a different form in each; in the adult producing massive consolidation, and in the child disseminated patches. The author prefers to reserve the term "bronchopneumonia" for the secondary form, calling the primary form disseminated croupous pneumonia.

J. Dunbar-Benton and J. Hurd-Wood¹⁰ report a case of relapsing pneumonia in a girl 9 years old. In the relapse a hectic temperature and profuse

¹ Lancet, Mar. 19, 1898.

² Arch. de Méd. des Enfants, Jan., 1898.

³ Gaz. hebdom. de Méd. et de Chir., Feb. 27, 1898.

⁴ Le Nord Méd., Dec. 15, 1897.

⁵ Brit. Med. Jour., May 28, 1898.

⁶ Brit. Med. Jour., Apr. 2, 1898.

⁷ Rev. Obstét. internat., No. 73, 1897.

⁸ Medicine, May, 1898.

⁹ Med. Brief, Jan., 1898.

¹⁰ Ibid.

sweating suggested empyema; but there was no fluid, although the vocal fremitus and resonance were absent below the fifth rib on the right side.

C. G. Stockton¹ reports a case of **relapsing lobar pneumonia** in which leukocytosis was absent. The patient was a girl, 8 years old, and the first attack lasted 16 days. On the fortieth day of the illness the first relapse occurred, lasting 7 days, and on the fifty-ninth day another relapse of equal length set in.

J. P. Parkinson² describes the case of a child, 6 years old, who had a pertussis-like cough, although he had had pertussis 4 years before. The left side of the chest was retracted, and at the postmortem the left bronchus was found to be occluded by pressure from enlarged lymphatic glands, and the left lung was airless.

DISEASES OF THE CIRCULATORY SYSTEM AND BLOOD.

J. H. Fruitnigh³ calls attention to **epistaxis** as frequently due to organic heart-disease, which may be overlooked. A case came under his observation in which there was mitral regurgitation, the patient having been under treatment for a long time by a rhinologist. E. E. Graham⁴ points out that a high pulse-rate or a moderate amount of fever in an infant is of no great significance unless the condition persists for some time.

Arrhythmia of the heart is discussed by J. Comby⁵ and O. Heubner,⁶ whose conclusions are strikingly similar. Aside from the organic diseases of the heart and brain, cases of arrhythmia fall into the following classes: 1. Idiopathic, essential, or physiologic arrhythmia, described by DaCosta, and occurring in children from 3 to 6 years of age, often in several in the same family. 2. Toxic from drugs, as digitalis and opium. 3. Of gastrointestinal origin; toxic, as in the dyspepsias, or reflex, as from lumbricoids. 4. In convalescence from acute infections, the result either of affections of the vagus or of myocardial degeneration. 5. In anemic or nervous children, especially in connection with chorea. 6. Following psychical disturbances; during sleep (Czerny), following exposure to cold after a warm bath (Löschner), all probably of reflex origin (Heubner). 7. Occurring in the diatheses of obesity, rachitis, etc. (Comby). Of whatever origin it may be, the final step in the production is either the action of a toxin on the heart-muscle or nerves, or a reflex disturbance of the innervation [so that the classification might be made of (a) functional disturbances and (b) minute organic changes]. Heubner thinks that the cases in which there is direct action on the vagus are rare. Herringham⁷ reports a case of a girl, 11 years old, who for 5 years had had [essential] paroxysmal **tachycardia**, the attacks coming on suddenly and lasting for varying periods from 1½ to 13 days, during which the pulse-rate would vary from 240 to 260. There was no decided pain, and no lesion other than a slight increase in the area of cardiac dullness. Treatment was ineffectual. Hanser⁸ observed an infant of 11 months, who had **pertussis** for 5 months and was very dyspneic for the last 5 weeks of life. At the autopsy both ventricles of the heart were found to be hypertrophied and dilated, and the only explanation that could be found for the condition was in the increased blood-pressure caused by the violent and prolonged cough.

¹ Phila. Med. Jour., June 25, 1898.

² Lancet, Mar. 26, 1898.

³ Arch. of Pediatrics, Aug., 1897.

⁴ Dunglison's Coll. and Clin. Rec., Dec., 1897.

⁵ Gaz. hebdom. de Méd. et de Chir., Aug. 28, 1897.

⁶ Zeit. f. klin. Med., Band xxvi., Hefte 5 and 6.

⁷ Trans. Clin. Soc., Jan. 8, 1897.

⁸ Ibid.

H. A. Hare¹ thinks, as the result of a personal collective investigation, that **digitalis** will fail more often to restore compensation in organic heart-disease in children than in adults.

H. B. Sheffield² reports a case of **pyemia** in which the portal of entrance for the infection was a small abrasion on the ankle-joint. Metastasis occurred to the heart, and although there were no cardiac symptoms during life, the necropsy showed vegetations on the valve and a purulent effusion of 1½ pints in the pericardium.

R. Y. Aitken³ found, at the necropsy in a boy, 9 years old, who died of chronic valvular disease, an **aneurysm** at the bifurcation of the abdominal aorta and plates of atheroma in the ascending arch, with perforation of one of the aortic valves.

W. H. Brown⁴ reports a case of **hemorrhage from the ear** after a **follicular tonsillitis**, the flow being so profuse and recurring so often that the condition was critical. Erosion of the internal carotid artery was suspected, so the common carotid was ligated and recovery followed slowly.

Reports of **leukemia** in children are made by Cassel,⁵ who found 4 cases in patients under 17 years of age, in the records of 3000 autopsies; and by L. Pollmann,⁶ who reports a congenital case due to intrauterine infection.

Cases of **purpura hæmorrhagica** are reported by J. L. Morse,⁷ whose case in an infant 12 months old seemed to be due to pneumococcal infection; by W. Johnson,⁸ in a boy of 12 years; and by A. C. Cotton.⁹ H. W. Syers¹⁰ discusses the condition, and thinks there is no relationship between rheumatism and uncomplicated purpura.

A. C. Pearce¹¹ reports 3 cases of **hemarthrosis** due to hemophilia, the outbreaks usually following slight traumatism. In 2 of the cases there was a family history of bleeding.

J. S. Fowler¹² reports 7 cases of **anemia** in children, with enlargement of the spleen. Leukocytosis was present in all, and all but 2 were rachitic. H. F. Vickery gives the notes of a fatal case in a child 18 months old, the spleen being enlarged to within 2 fingers' breadth of the left iliac spine. Leukocytosis was also present.

As a result of the study of **the blood in icterus** of the new-born, Kospelmacher¹³ found that the red corpuscles presented no signs of destruction, but rather of active new-formation.

DISEASES OF THE NERVOUS SYSTEM.

L. E. Holt¹⁴ reports 5 cases of **abscess of the brain** in infants, with a summary of 27 other cases in infants and very young children. His conclusions are as follows: 1. Abscess of the brain in children under 5 years is rare. 2. The principal causes are otitis and traumatism. 3. It rarely follows acute otitis, but most often neglected cases, and is usually secondary to disease of the petrous bone. 4. In the cases occurring in infancy without evident cause, the source of infection is probably the ears, even though there is no discharge. 5. The development of abscess after injury to the head without fracture of the skull is extremely rare; in nearly all of the traumatic cases definite cere-

¹ Therap. Gaz., No. 4, 1897.

³ Lancet, Apr. 23, 1898.

⁵ Berlin. klin. Woch., Jan. 24, 1898.

⁷ Ann. of Gyn. and Pediat., Jan., 1898.

⁹ Clin. Rev., Dec., 1897.

¹¹ Brit. Med. Jour., Apr. 30, 1898.

¹³ Wien. med. Woch., No. 43, 1896.

² Med. Rec., Mar. 12, 1898.

⁴ Ibid., June 4, 1898.

⁶ Münch. med. Woch., Jan. 11, 1898.

⁸ Med. News, Jan. 1, 1898.

¹⁰ Lancet, Feb. 12, 1898.

¹² Scottish M. and S. Jour., May, 1898.

¹⁴ Arch. of Pediatrics, Feb. and Mar., 1898.

bral symptoms show themselves within the first two weeks after the injury. In cases with falls as remote as several months there is probably some other cause, such as latent otitis. 6. In a large proportion of the cases only general symptoms are present, and these in very great variety. 7. Focal symptoms may be misleading unless they are constant, and even then they may depend upon associated lesions, such as meningitis; motor symptoms only can be trusted, since the sensory symptoms are difficult or impossible to determine in infants or young children. 8. Rapid progress, fever, and a history of injury or otitis generally make a diagnosis from tumor easy; in the slower cases with little or no fever, valuable assistance may be obtained from lumbar puncture. 9. From acute meningitis the diagnosis is more difficult, and in the cases in which there are only terminal symptoms the diagnosis is impossible; in the more protracted cases the distinctive points with reference to abscess are the slower and more irregular course, and, as a rule, a lower temperature. 10. On account of the great amount of shock attending brain-surgery in very young children, operations should not be urged unless definite localizing symptoms are present, the principal one being hemiplegia.

Rossolimo and Bouchet¹ report the case of a boy, 9 years old, with symptoms of **cerebellar tumor** which had lasted for a year. There were headache, vomiting, secondary atrophy of the optic nerve, epileptiform convulsions, and paresis of the sixth and seventh pairs of cranial nerves. At the autopsy angiosarcoma of the spinal meninges was found extending up to the medulla and cerebellum. The spinal cord itself was unchanged and the cerebellum was invaded at one point only, the inferior vermiform process, by a single nodule. Six similar cases have been reported. Zappert² reports a case of parietic dementia in a girl, at present 13 years of age, in whom the symptoms had existed for 2 years. There was first difficulty in walking, the left leg being dragged; then mental symptoms appeared, the child becoming vicious, of uncontrollable temper, unable to follow her studies, acting without motive, and occasionally having spontaneous evacuations of the bowels and urine. The facial muscles were flaccid and the mouth contorted; the pupils did not react to light, but accommodation was intact. There were disturbances of speech and the characteristic disturbances of writing. Kassowitz had treated the child for hereditary syphilis.

M. B. Ray³ reports a case of **acute melancholia** in a girl 14 years old. S. G. Gay⁴ reports a case of thigh-friction in a girl 1 year old. The child is now 5 years of age, and seems to have been broken of the habit by moral treatment on the part of the mother.

An editorial⁵ inveighs against the pernicious practice of quieting a crying baby with a **rubber nipple**. It sets up a bad habit; tends to produce a deformity of the upper jaw; predisposes to mouth-breathing and to disturbance of the salivary glands, leading to unnatural dryness in the mouth later.

J. Thomson⁶ discusses the diagnosis and prognosis of certain forms of **imbecility** in childhood. The conditions discussed are microcephalus, mental defects with cerebral infantile palsy, imbecility, cretinism, and achondroplasia. The latter is a form of imperfect fetal development. Eclampsia in infants may also leave permanent mental impairment. B. Sachs⁷ describes a peculiar disease, first recognized by ophthalmologists on account of the peculiar changes in the eye-grounds. These are described by Tay as presenting a diffuse white

¹ Arch. of Pediatrics, Jan., 1898.

² Birmingham Med. Rev., Apr., 1898.

³ Southern Med. Rec., Mar., 1898.

⁴ Therap. Woch., No. 4, 1897.

⁵ Med. and Surg. Reporter, Sept., 1897.

⁶ Scottish M. and S. Jour., Mar., 1898.

⁷ Deutsch. med. Woch.

spot in the macula lutea, with a brown center. Sachs has also found peculiar changes in the cerebrum, consisting of a primitive type of the convolutions, macrogyria, degenerative changes in the large pyramidal cells, absence of the tangential fibers, and decrease of the fibers of the white matter. The blood-vessels are normal; but there is a degeneration of the pyramidal columns of the spinal cord. The symptoms are: 1. Psychic disturbances that appear in early life and progress to total idiocy. 2. Paresis, and ultimately paralysis, of the extremities, either flaccid or spastic. 3. The tendon-reflexes may be increased, decreased, or normal. 4. Partial, and later total, blindness. 5. Marasmus and death, usually before the second year. 6. Distinct familial type. Nystagmus, strabismus, and sharpness or impairment of hearing are occasionally present. Sachs has collected 27 cases of this **amaurotic family idiocy**, all of them being in Jews; but the author thinks that this is partly accidental. H. Koplik¹ reports 2 cases in different families, no other members of the family being affected.

J. Heller² reported 6 years ago a case of **chronic hydrocephalus** in a child with hereditary syphilis. Under appropriate specific treatment the hydrocephalic symptoms disappeared. The early diagnosis has since then been confirmed by the appearance of interstitial keratitis, Hutchinson's teeth, and a periosteal gumma.

A. Schiff³ discusses the value of **lumbar puncture** as a diagnostic means. Turbid fluid indicates meningitis. Spontaneous coagulation in a clear fluid is highly suggestive of inflammation.

L. Stieglitz⁴ reports 3 cases of **multiple sclerosis** in young children, and collects 35 reported cases.

T. Buzzard⁵ reports several cases which strengthen the infectious theory of the etiology of **acute anterior poliomyelitis**, and he discusses the question.

H. N. Moyer⁶ reports a case of primary **lateral sclerosis** in a boy 5 years of age. The family history is free from neurotic heredity.

C. T. Dereum⁷ reports a case of **idiopathic multiple neuritis** in a child 5 years old. The etiology of the attack was so obscure that the author advances no theory in regard to it.

J. C. Wilson⁸ gives the notes of a case of **tic convulsif** in a boy 15 years old. The attack showed a rather complicated tic. The expression of the face became anxious, and the muscles of expression twitched. The eyes were closed and opened rapidly. The body was bent forward, with the hands resting on the knees, the head drawn forward, the thighs and knees flexed; the head and upper part of the body were moved violently backward and forward for about half a dozen times. The paroxysm would end with a long, sighing inspiration.

Various **hysterical manifestations** are described by E. Mackey,⁹ Steiner,¹⁰ and C. W. Burr.¹¹

A. F. Witmer¹² has studied the stigmata of **degeneration in epilepsy**, classing them under 3 heads: (a) Morphologic deviations from the normal, consisting of asymmetry of the skull and face, dental anomalies, inflammation of the skin, and anemia. (b) Functional deviation from the normal, such as retarded puberty, gluttony, etc. (c) Purely psychic stigmata.

¹ Arch. of Pediatrics, Oct., 1897.

² Wien. klin. Woch., Mar. 3, 1898.

³ Lancet, Mar. 25, 1898.

⁴ Ibid., Apr. 2, 1898.

⁵ Treatment, Jan. 13, 1898.

⁶ Jour. Am. Med. Assoc., No. 22, 1897.

⁷ Deutsch. med. Woch., Feb. 3, 1898.

⁸ Am. Jour. Med. Sci., Feb., 1898.

⁹ Phila. Med. Jour., Apr. 23, 1898.

¹⁰ Arch. of Pediatrics, Dec., 1897.

¹¹ Jahrb. f. Kinderh., p. 187, 1897.

¹² Arch. of Pediatrics, Aug., 1897.

Chorea.—The subject of the etiology is reviewed by Legay.¹ Weir Mitchell and J. H. W. Rhein² classify the motor symptoms into 5 clinical groups: 1. Cases in which there is at some stage absence of the motions when at rest. 2. Cases in which the movements are less when the child is at rest, but are aggravated by voluntary movements. 3. Cases in which the severe choreiform movements disappear during voluntary movements. 4. Cases in which voluntary exertion does not influence the movements. 5. Cases presenting at different stages more than one of the above types. Notes are given of cases illustrating each one of the different types. L. Y. Guthrie,³ on the above classifications, bases 2 groups affording the indications for treatment: 1. Sthenic, or explosive. 2. Asthenic, or pseudoparalytic. For both groups rest in bed is essential at the start; sedative drugs, such as chloral, the bromids, antipyrin, etc., are indicated in the first group; and tonics, like quinin, arsenic, and strychnin, in the second.

C. W. Burr⁴ reports a case of chorea occurring in the course of a scarlatinal nephritis, with fatal termination in uremia. He discusses the relationship between the three conditions.

W. N. Moyer⁵ reports 2 cases of **Friedreich's ataxia** in brothers aged 16 and 14 years. J. Simon⁶ observed a case in a boy of 10 years, who died suddenly, without discoverable cause at the necropsy. In a microscopic examination of the brain and cord there was found a combined sclerosis of the posterior columns, the pyramidal tracts, and the direct cerebellar tracts, with lesions of the cells of the gray matter.

Brauer⁷ reports as an instance of **pseudobulbar paralysis** in childhood the case of a girl of 14 years who had convulsions when 11 months old, followed by symmetrical paralysis of the tongue and lips, with anesthesia and moderate dysphagia. At the author's examination there was paralysis of the orbicularis oris, of the pterygoids, tongue, and uvula; but these muscles were not atrophic nor degenerated, and sensation was unimpaired. The right arm and leg were paretic, the arm being undersized. The author concludes that the lesion was supranuclear and that the condition was a pseudobulbar paralysis.

DISEASES OF THE URINARY SYSTEM.

J. P. C. Griffith and W. S. Newcomet⁸ discuss types of **edema** in infants and children, showing that many cases do not depend upon nephritis, but are of obscure etiology.

P. Vergely⁹ has frequently found **acetone, diacetic acid, and oxybutyric acid** in the urines of infants who had digestive troubles: the prognosis is good, as the substances are probably the result of microorganismal activity in the intestines. The treatment consists in cutting off meat from the diet, which should consist of carbohydrates; purgatives and emetics may be needed, and alkalies and glycerin are of use.

Umlison¹⁰ studied the urines of nursing-children with reference to the **diazo-reaction**, which was never present in health nor in a long list of diseases, but was always present in erysipelas and measles, and for 1 or 2 days before death from any disease; hence this may be of prognostic importance.

J. Comby¹¹ has seen several cases of **movable kidney** in children, and

¹ Thèse de Paris, 1897.

² Treatment, Mar. 10, 1898.

³ Northwest Lancet, June 15, 1897.

⁴ Deutsch. Zeit. f. Nervenhe., S. 416, 1897.

⁵ Arch. Clin. de Bordeaux, Sept., 1897.

¹¹ Sem. méd., No. 25, 1897.

² Phila. Med. Jour., Jan. 22, 1898.

⁴ Arch. of Pediatrics, Jan., 1898.

⁶ Progrès méd., Sept. 4, 1897.

⁸ Med. News, Oct. 2, 1897.

¹⁰ Vrathe, No. 39, 1897.

even in infants. The condition resembles that in adults, with digestive disturbances and dilatation of the stomach.

Chronic interstitial nephritis in children is described by L. G. Guthrie,¹ who reports 7 cases occurring between 5 and 14 years of age, and giving the symptoms, which resemble those of the condition in adults.

O. Heubner² treats of **chronic nephritis**, which is not so rare in children as is generally supposed. The condition is easily overlooked for a long time because the early diagnosis can be made only by urinalysis, general symptoms being absent. Even when recognized, treatment is of no avail, although the duration of the case may be many years. It is of the greatest importance to avoid taking cold.

Hutinel³ describes **cystitis** due to the **colon-bacillus**, occurring in young girls affected with diarrheas; a vulvovaginitis usually precedes the cystitis, showing that the infection is from without inward. Finkelstein⁴ has seen cystitis as a frequent complication of many severe diseases, like pneumonia, meningitis, etc., retention being the great predisposing factor; here, too, the germs enter through the urethra in most cases.

CONGENITAL MALFORMATIONS.

Space does not permit an extended mention of the many interesting congenital deformities which have been reported. As instances of those which are of the nature of **curiosities** the appended skiagraphs of cases seen by F. A. Packard⁵ serve as good examples (Plate 5). Those malformations which affect the **heart and other viscera** are, of course, of vital importance, and cases reported by G. Variot⁶ are of special interest. The author observed 2 children with similar cardiac conditions—namely, interventricular perforation, narrowing of the pulmonary artery, with the aorta arising from both ventricles. Cyanosis existed in one case, but was absent from the other; and the author therefore concludes that this disproves both theories with regard to the origin of cyanosis—the mixture of the two bloods, and the obstruction to the pulmonary circulation. He advances the view that it is due to a hyperglobulia which is not constantly associated with congenital cardiac malformations.

¹ Lancet, No. 3835, 1897.

² Gaz. hebdom. de Méd. et de Chir., Sept. 2, 1897.

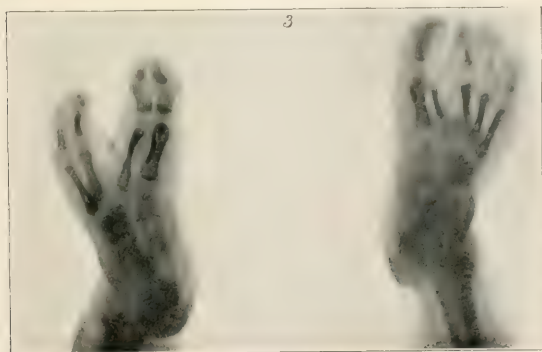
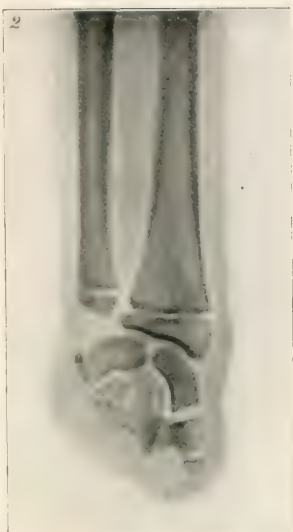
³ Rev. internat. de Méd. et de Chir., vol. vii., No. 23.

⁴ Rev. prat. d'Obstét. et de Gyn., No. 7, 1897.

⁵ Arch. of Pediatrics, Apr., 1898.

⁶ Jour. de Clin. et de Thérap. Infant., No. 20, 1897.

PLATE 5.



Skiagraphs of malformations of the hands and feet (Arch. of Pediatrics).

PATHOLOGY.

BY JOHN GUITÉRAS, M. D., AND DAVID RIESMAN, M. D.,

OF PHILADELPHIA.

The Year's Work.—The attention of pathologists during the past year has largely been centered on cellular changes, and it may be truly said that the study of cellular pathology has never been more active and vigorous than now. Diseases in which it was formerly customary to pass over the anatomic changes in silence, have been found to possess a distinct pathology and to show cellular alterations which, if not always specific, are yet significant. The study of tumors has also been revived by the enthusiasm for research in cell-structure, and we have made reference to some important observations in this field, adding to our knowledge of sarcomatous growths. Inflammation is still a battleground for conflicting views, and the spirited polemic of our German *confrères* adds not a little to the interest of the subject. The chief point of contention is the source of the cell-accumulation in inflammation; we give this year the views of those believing in what we would call the extrafocal origin of the cells. Fibrinous inflammations have been studied considerably in the past twelvemonth, to determine whether the fibrin is the result of coagulation-necrosis of an exudate or a degeneration of the fixed connective tissues; the question is discussed in the following pages. The subject of agglutination, while perhaps not so prominent as last year, is still of interest, particularly since the discovery of the agglutination of filtered, bacteria-free cultures, to which reference is made in this section. Ehrlich's striking theory of immunity will be found clearly stated. On the surface it seems somewhat hypothetic; but there is a certain amount of experimental evidence in its favor. Metchnikoff's doctrine of phagocytosis is being defended as ably as ever by the school of the Pasteur Institute; while its opponents in Germany and Russia are no less able and earnest. Abstracts have been made from papers on both sides of the question. We should not neglect to chronicle, as an index of the ever-growing importance of pathology, the founding, in the summer of 1897, of the German Pathologic Society, under the presidency of Rudolf Virchow.

THE BLOOD.

The Influence of Arsenic on the Blood and Bone-marrow of the Rabbit.—S. Bettmann¹ has made a careful study of the influence of arsenic on the blood and bone-marrow of the rabbit. Its influence on the blood is summarized as follows: 1. In the course of subacute arsenical poisoning in the rabbit the number of red corpuscles is reduced, also the quantity of hemoglobin. 2. A notable change in the number of leukocytes does not occur. 3. There is, however, a relative change of forms, the small lymphocytes increasing, the eosinophiles decreasing. 4. Nucleated red corpuscles appear in the blood during the course of the poisoning. 5. The

¹ Ziegler's Beiträge z. path. Anat. u. z. allg. Path., Band xxiii., Heft 3, 1898.

resistance of the leukocytes, especially the large round-cell forms, is diminished. 6. The resistance of the red corpuscles is diminished; isotony toward salt-solution is increased. 7. Following each injection of arsenic there is a transient rise in the number of red corpuscles, a phenomenon best explained by the entrance into the circulation of erythrocytes. The hemoglobin is increased, also the number of eosinophile cells; the resistance of the corpuscles is diminished, while some corpuscles appear to have an abnormally high resistance. The diminished resistance of the red corpuscles may be used to explain the pigmentation of the skin occurring in man. Formerly this was attributed to elimination of the poison through the skin; later the pigment was proved to contain iron, and must be considered hematogenous in origin. The lessened resistance of the corpuscles in arsenical poisoning permits the hemoglobin to be set free and favors the formation of pigment. Regarding the influence on the bone-marrow, Bettmann shows that the introduction of a small quantity of arsenic produces hyperemia of the cortical, later of the central, marrow, with an accumulation of nucleated red cells and their transformation-forms into erythrocytes. The bone-marrow cells also proliferate; but a part show degenerative changes. The cells with the eosinophile granules are the least resistant. The progressive changes, in a general way, keep pace with the regressive; when larger doses of arsenic are used the regressive changes predominate over the progressive. Lymphoidization is slower or in abeyance; but even in severe poisoning an increase of the nucleated red corpuscles can be seen. The changes in the bone-marrow are similar to those in the liver. In the latter there are also progressive changes as well as cell-necrosis. To decide the question whether arsenic exerts a direct formative cell-stimulus, the karyokinetic changes and the increase in myeloid cells have not much value; despite the fact that they appear very early, they may be explained as the reaction of the bone-marrow tissue to a noxious agent acting generally throughout the body—*i. e.*, a generally-acting anemogenic agent. On the other hand, the early increase of nucleated red cells in poisoning with small doses, which appears to bear no relation to the degree of general injury or to the degree of lymphoidization of the marrow, can be explained on the ground that arsenic causes a direct increase in these elements. If it is true that an increase of nucleated red corpuscles depends on direct stimulation by arsenic, the experiments of the author certainly serve to explain the therapeutic value of arsenic in pernicious anemia. The toxic doses used in the experiments caused the hemopoietic property of arsenic gradually to disappear. The arsenical anemia appears to be due to the increased destruction of red cells which is connected with the diminution of their resistance in the circulating blood. There was, however, no increase of iron-containing pigment in the bone-marrow. The appearance, especially the early appearance, of nucleated red corpuscles in the blood is explained by a study of the bone-marrow. Some light is also thrown on the degeneration of the leukocytes found in the blood, as far as the degeneration of circulating polymorphonuclear elements is concerned; it is demonstrated that this degeneration does not occur in the blood-stream, but that the cells reach the circulation from the bone-marrow already degenerated. Occasionally giant-cells enter the blood, but in very small numbers. The majority of leukocytes which enter the blood from the bone-marrow are polymorphonuclear, finely granulated cells. Eosinophile cells are not found. Against the view that the changes found by the author in the bone-marrow and in the blood are due to a specific action of the arsenic, it might be said that they are not at all related to the nature of the poison, but are simply dependent on the general damage done by the arsenic, and are the reaction produced by the arsenic-anemia. In answer to

this objection, the author states that the blood-changes do not correspond to those found in secondary anemias; and, secondly, that the bone-marrow changes are peculiar in their nature, and are not merely the expression of lymphoidization following anemogenic changes. However, the researches do not justify conclusions on the manifold therapeutic attributes of arsenic. Yet the experiments give some revelation of the beneficial influences of arsenic on blood-formation. The occurrence of arsenical anemia does not contradict this, since it is the effect of larger doses on already formed blood-corpuscles. In a similar manner the leukocytic elements are damaged, and it would be very interesting to determine whether the poison in small therapeutic doses exerts an inhibitory, resistance-diminishing action on the leukocytes. If this could be shown, it would offer some explanation of the curative influence of arsenic in leukemia, tumors of lymph-glands, and sarcomatosis. [These studies are an indirect contribution to the pathology of the anemias. If it can be shown, as von Noorden has already claimed, that iron is a stimulant of the bone-marrow, a scientific basis will be furnished to the iron-treatment of chlorosis, and the bone-marrow will be proved to be in some way at fault in this disease. The experiments should not be difficult, following the lines laid down by Bettmann.]

Morphologic Changes of the Red Blood-corpuscles and Fibrin in Vital Extravascular Coagulation.—Franz Müller¹ makes an interesting contribution to the subject of the coagulation of the blood, arriving at the following conclusions: 1. In the rabbit the coagulation of the blood presents the same character within and without the living organism. 2. The red corpuscles possess different degrees of resistance and show various disintegration-phenomena. 3. During the formation of fibrin the erythrocytes take a prominent part. 4. The blood-plaques arise from the most part from the red corpuscles, and in a small part from the leukocytes. From the first they arise in various ways, by constriction, by fragmentation, by extrusion. 5. The so-called granule-spheres of Semmer are disintegrating erythrocytes. 6. The morphologic study does not point to any extensive leukocytic origin of the coagulation of the blood. 7. The fibrin arising during coagulation of the blood shows a variable reaction toward Weigert's fibrin-stain.

Concerning the Action of Certain Narcotic Substances on the Blood-alkalinity and the Red Corpuscles.—Thomas² has investigated the effect of several toxic substances on the blood, and reports his results with alcohol, chloroform, and ether. In a former study he found that after the administration of alcohol to a rabbit, the animal succumbed to one-sixth the dose of cholera-germs that was necessary to kill a nonalcoholic rabbit. This fact was explained by assuming that alcohol diminishes the bactericidal action of the blood. In the present paper the studies are detailed which were made to determine what factors of the blood were affected by alcohol. Experiments were also made with chloroform and ether. The conclusions arrived at are as follows: 1. In acute alcoholic intoxication the carbonic acid as well as the alkalinity is greatly reduced, due to the fact that there is an increase of volatile fatty acids, which, for the moment, displace the carbonic acid. The decrease of the red corpuscles cannot be of importance, as it is not constant. 2. The effects of chronic alcoholism make themselves fully manifest only after several months. The alkalinity remains about normal; the oxygen decreases, and later also the carbonic acid. 3. In subcutaneous injections of ether, just as after injections of morphin and chloral, the oxygen of the blood is reduced. The carbonic acid and the alkalinity remain practically the same. After the inha-

¹ Ziegler's Beiträge z. path. Anat. u. z. allg. Path., Band xxiii., Heft 3, S. 498, 1898.

² Arch. f. exper. Path. u. Pharmacol., Band xli., Heft 1, Mar., 1898.

lation of ether the carbonic acid is increased, the oxygen diminished, and the alkalinity unaltered; while the number of corpuscles is increased, and may even be doubled. This is to be explained on the ground that the blood becomes inspissated and venous on account of the diminished oxygen-supply. 4. Chloroform seems to diminish the alkalinity of the blood.

The Effect of a Change of Temperature on the Blood.—Friedländer,¹ in experiments on the effect of heat and cold on the blood, found that after a prolonged exposure to cold there occurred a diminution in the red corpuscles and an increase in the white, and a lowering of the specific gravity. There was no alteration in the density of the serum. After a short exposure to cold both the red and the white corpuscles were increased and the specific gravity was raised, the serum-density being unaltered. Warmth increased both the red and the white corpuscles, especially the latter, and raised the specific gravity of the blood and the density of the serum. Friedländer thought that perspiration played some part in producing the change.

A Study of the Leukocytosis in Experimental Intoxication and Immunization by the Diphtheria-toxin.—Joseph Nicolas and Paul Courmont² have studied this subject under 3 heads: First, leukocytosis in rapid intoxication by large doses of toxin, in the rabbit; second, leukocytosis in slow intoxication by single or repeated weak doses of toxin, in the rabbit; and third, leukocytosis in the course of immunization against diphtheria by injections of small and repeated doses of diphtheria-toxin, in the horse. Their chief conclusions are as follows:

I. In rapid intoxication by large doses of diphtheria-toxin rabbits never present hypoleukocytosis; there is more often a very slight hyperleukocytosis, and more rarely an extremely well-marked hyperleukocytosis, which is explained by the reaction of the organism to the intoxication. In exceptional cases the conditions may be explained as follows: the organism, veritably overwhelmed by the poison, either does not react well or reacts immoderately. The variations in the number of the leukocytes are, then, neither as constant nor as regular as the other symptoms of massive intoxication—for instance, the temperature-variations and the nearly uniform rapidity of death.

II. In slow intoxication with fractional doses of toxin rabbits react in a different manner. Slow intoxication is rarely accompanied by hypoleukocytosis, which seems not to be a favorable phenomenon. It nearly always produces hyperleukocytosis of variable degree. The variability depends more upon the susceptibility of the animal than upon the dose injected. If death supervenes rapidly the hyperleukocytosis is ordinarily progressive; if, on the other hand, the animal lives for a time the number of white corpuscles presents marked oscillations, which persist for a long period after the last injection is given. The reaction of the leukocytes is often synchronous with the thermic reaction, but is ordinarily more prolonged than the latter. The two are symptoms of intoxication.

III. The frequent absence of the reaction of the leukocytes seen in rapid intoxication, and the constancy of hyperleukocytosis in slow intoxication by weak doses of diphtheria-toxin, should cause hyperleukocytosis to be interpreted as a defensive reaction of the organism in the course of intoxication.

IV. In the course of a long immunization against diphtheria-toxin a leukocytic reaction is very rarely seen in the horse. The modifications of the organism which produce immunity seem to occur effectively without appreciable variation in the number of leukocytes; consequently, hyperleukocytosis being a symptom of severe intoxication, a marked increase in the number of the

¹ Fortschr. d. Med., July, 1897.

² Arch. de Méd. expér. et de Anat. path., July, 1897.

leukocytes in the course of immunization indicates that too strong and too dangerous doses of toxin have been injected. In a word, hyperleukocytosis, which is a symptom of intoxication, also indicates the defence of the organism; but it is not necessary for immunization.

Leukocytosis in Diphtheria.—Besredka¹ concludes as follows: 1. After a massive dose the number of polynuclear leukocytes describes a curve of parabolic form, with its height 12 to 16 hours after the inoculation, and increasing rapidly and regularly until death. 2. In slight intoxication the course of the polynuclears is represented by an oscillatory curve. 3. In the course of immunization leukocytic reaction is very manifest, particularly during the first hours after the injection. 4. Animals which have been saved by antitoxic serum from massive doses of toxin show the same oscillation in the polynuclear leukocytes as in mild cases of intoxication. 5. Children recovering from diphtheria show polynuclear leukocytosis lasting from 12 to 15 days. 6. If the course of the disease is irregular, or if phenomena preventing a cure supervene, the blood shows a decided correlation between polynuclear leukocytosis and the gravity of the disease. 7. Cases going on to a fatal termination in spite of serum show the characteristic polynuclear leukocytosis. The degree of polynuclear leukocytosis after the injection of antitoxic serum constitutes one of the surest elements of prognosis in diphtheria.

Studies on Leukocytes.—Hugo Weiss² holds that the chemical composition of the granules and the mode of their production are still unsettled, as is also the origin of physiologic leukocytosis. Pathologic leukocytosis is due to the presence in the blood of some chemotactic substance, generally of bacterial origin. It is possible that hypoleukocytosis, such as that of typhoid fever, may depend on negative chemotactic action. The leukocytes in the infectious diseases antidote the toxic products by bringing the cell-constituents in combination with the toxin, while at the same time they act as phagocytes.

Metabolism in Leukemia and Pseudoleukemia.—W. v. Moraczewski³ has made a most laborious "Stoffwechselversuch" in the case of leukemia and pseudoleukemia, and concludes that leukemia is a "nitrogen-and-phosphorus disease," since both of these substances are retained in the system in large quantities. Chlorin is also retained as well as calcium, but not to the same extent as phosphorus and nitrogen. In pseudoleukemia more nitrogen and calcium and less chlorin and phosphorus are retained in the system. These abnormalities are to be explained on the general sluggishness of metabolic processes and imperfect disassimilation. These facts suggest important therapeutic indications, since the substances that are retained ought to be supplied to the system. This is especially true in the case of chlorids. The xanthin-bases were not eliminated in greater quantities, neither in leukemia nor in pseudoleukemia. The author believes, however, that had the leukemic patient been examined in another stage of the disease there might have been increased elimination of uric acid, since this depends chiefly on what is going on in the spleen. Fränkel has shown that increased uric-acid elimination coincides with resorption of the splenic tumor. The relation of the alloxur-bodies to the nitrogen in leukemia was 1:60; in pseudoleukemia, 1:50.

Metabolism in Acute and Chronic Leukemia.—Magnus-Levy⁴ has made comparative studies of the metabolism in 3 cases of acute and 2 of chronic leukemia, and has found striking differences between them. The acute cases were characterized by excessive elimination of uric acid (in one case the enormous quantity of 8.72 gm. in a day), great losses of nitrogen, and large

¹ Ann. de l'Inst. Pasteur, May, 1898.

² Virchow's Archiv, Band cli., S. 22.

³ Wien. klin. Woch., Jan. 20, 1898.

⁴ Ibid., Band cli., Heft 1, 1898.

amounts of urine, all increasing up to death; in the chronic cases there were an approximate nitrogen-equilibrium, moderate quantity of uric acid, no ante-mortem increase. The contrast is readily explained: the excessive tissue-destruction in the first group is an index and a cause of the acuity of the process. Regarding the relation of the uric-acid excretion to the leukocytosis, the author expresses the opinion that there is no parallelism between the number of leukocytes and the quantity of alloxur-bodies. Though the latter expresses the decomposition of nuclein, this is not entirely confined to the leukocytes in the blood. It might even, *a priori*, be an expression of increased vital energy or of abnormal processes in functioning cells that are not hastening toward death, as well as an index of cellular destruction and rapid decomposition. Furthermore, too much importance may have been attached to the leukocytes in the blood when the liver and spleen contain so many more of these cells. An interesting fact of wide bearing is the demonstration that the loss of albumin in the acute cases, indicated by excessive nitrogen-excretion, was connected with loss of blood from hemorrhage; the author cites a similar disturbance in the nitrogen-equilibrium in a case of purpura hæmorrhagica. The excretion of phosphorus in the urine in acute leukemia was greatly increased in the author's cases, and this increase is attributed, very properly, it would seem, to excessive breaking-up of nuclein, which contains from 3.2% to 9.6% of phosphorus. The blood in the leukemic cases contained a large quantity of uric acid, considerable hypoxanthin, and traces of xanthin.

Leukemia.—J. M. Buchanan,¹ after discussing the various kinds of granulations seen in the leukocytes in cases of leukemia, adds a note on the occurrence of cells resembling the uninucleated marrow-cells or myelocytes, in which oxyphilic and basophilic granulations occur side by side. He prefers the classification of Kanthack and Hardy to that of Ehrlich for the leukocytes in leukemia.

Thrombosis in Chlorosis.—H. Schweitzer² reviews the cases of thrombosis in chlorosis recorded in literature, of which there are 47, and adds 4 of his own from Eichhorst's clinic. The thrombosis may occur in all grades of chlorosis, in the mild as well as the severe. The condition is localized chiefly in 3 places: 1, the cerebral sinuses; 2, the lower extremities; and 3, the upper extremities. In the cases of the first group the longitudinal sinus was thrombosed in 10, the transverse in 8; the veins of Galen in 6; the torcular in 5; the sinus rectus in 3; and the superior cerebral veins in 2. Thrombosis of the extremities is more frequent, 74% of all cases affecting the limbs, and the vast majority the lower. As to the cause, the author shares the view of Eichhorst, that it is dependent on fatty degeneration of the intima of the vessels.

Retrograde Embolism.—Paul Ernst³ reports an indisputable example of retrograde embolism. Czerny had operated on a man for tumor of the left kidney, probably a hypernephroma; during the operation artificial respiration was performed for chloroform-syncope, which ended fatally. At the autopsy the renal artery was occluded by tumor-masses; there were metastases in the liver and tumor-emboli in the portal vein. In one of the veins of the left ventricle of the heart a movable embolus was found, consisting of tumor-tissue; the radicles of the vein were free from metastasis. The embolus could scarcely have reached the heart through the inferior cava by gliding along the vessel-wall in obedience to a centrifugal, wave-like motion, as Ribbert claims for retrograde emboli; it is more likely that there was a reversal of the blood-

¹ Jour. Path. and Bact., p. 242, 1897.

² Virchow's Archiv, Band clii., S. 337.

³ Ibid., Band cli., S. 69.

stream. [Both of these theories are probably necessary to explain different cases of retrograde embolism.]

Air-embolism.—Bégouin¹ has investigated the mechanism of death from air-embolism, and finds that the rapidity of death depends rather upon the amount of air in the right ventricle and on the rapidity or force with which the air is introduced. These factors determine whether the asphyxia shall be rapid or slow. On postmortem examination the author found the right ventricle greatly distended with frothy blood. If a fine trocar was passed into the right ventricle after the admission of air by the veins, and aspiration was performed, death did not take place, but the animal recovered after a short time. He concludes, therefore: 1. That death is due to distention of the right ventricle by the air, and, secondarily, to right-sided asystole. 2. That removal of the air by aspiration allows the ventricle to react.

The Pathologic Physiology of Thrombosis.—Cornil² has arrived at the following conclusions on this subject: 1. The organization of an intravascular blood-clot is made at the expense of the cellular elements of the internal lining of the vessel—namely, the endothelial cells of the veins and arteries. The fibrous network of the blood-clot serves as a support for the development of these elements. 2. The phenomena of organization are very rapid; they commence from the first day, by modifications in the endothelial cells. The capillaries appear about the third or fourth day, and connective tissue about the ninth or tenth. 3. The extent and degree of traumatism that the vessels have sustained have a certain influence on the extent and rapidity of the organization. Infection of the blood-clot, on the contrary, delays these phenomena. 4. The phenomena of organization are everywhere the same, wherever the seat of the blood-coagulation may be, whether the vessel, the heart, the lungs, or the cellular tissue. According to the location, the agent of organization is a vascular, cardiac, pulmonary endothelial cell, or, better, the cell of connective tissue from which the others are derived.

THE CIRCULATORY SYSTEM.

Experimental Researches on Aortitis.—Boinet and Romary³ have studied experimentally-produced aortitis in order to determine the etiologic significance of traumatism, of infection, and of intoxication. After making 24 observations on guinea-pigs and rabbits, they find that aseptic traumatism does not produce aortitis; but it favors the production and localization of aortic lesions of infectious or toxic origin. In removing the endothelium from the intima of the artery a *locus minoris resistentiæ* is created, and the conditions of receptivity, which patches of atheromatous ulceration and chronic lesions of endarteritis present clinically, are produced. In 2 cases they found patches of aortitis following injections of cultures of microorganisms without previous aortic traumatism (bacillus of Eberth, diphtheria). As a general rule, however, a *locus minoris resistentiæ* is necessary for the production of infectious aortitis. Experimentally, the place of lessened resistance may be produced by traumatism; clinically, by a previous arterial lesion or by a nutritive disorder of the vessel-wall. Frequently infectious aortitis depends upon the direct implantation of an active microorganism on a point prepared to receive it. This is the habitual mechanism of acute infectious aortitis, which is due to various microorganisms and is observed clinically in the course of many infectious states. The nature of the microorganism injected is of some importance;

¹ Arch. clin. de Bordeaux, Jan., 1898.

² Gaz. des Hôp., Aug. 28, 1897.

³ Arch. de Méd. expér. et d'Anat. path., Sept., 1897.

thus, the staphylococcus has given no results. Toxins used alone by subcutaneous or intravenous injection may give rise to patches of acute aortitis, especially if the aorta has suffered traumatism previously. In this manner aortic lesions have been obtained with the toxins from cultures which had been heated several times to 110° F., or which had been filtered through Kitasato's apparatus (diphtheria, streptococcus, cholera, and tuberculin). Aortic lesions following the injection of toxins have also been observed without previous traumatism. Histologic examination of these areas of experimental aortitis of infectious or toxic origin shows lesions of acute endarteritis. There is also an embryonic cell-infiltration in the adventitia, which is particularly well marked about the vasa vasorum. If the microorganism is much attenuated, a lesion having a chronic tendency may be determined; this is also the case when toxins are the cause. If the animal experimented on lives a long time, these lesions are very apt to end in arteriosclerosis. The sclerotic process was well marked in the aorta of a horse immunized by frequent injections of diphtheria-toxin. Toxins, however, require a very high degree of toxicity in order to produce the same acute aortic lesions that are set up by attenuated or feebly virulent microorganisms. According to the intensity of action, the dose injected, the length of the experiment, and the number of inoculations, toxins reproduce the intermediary stages and the transitional changes from acute aortitis to chronic endarteritis described by Cornil and Ranvier. The clinical evolution of infectious aortitis developing after typhoid fever, the eruptive fevers, etc., and becoming the starting-point of chronic lesions of the aorta, may be thus explained (Potain, Landouzy, Brouardel, etc.). The action of the toxins was comparable to the action of toxic substances (lead, uric acid, sodium urate, phloridzin) which were administered to animals in order to put them in conditions approaching saturnism, gout, and diabetes. The experimental intoxications produced areas of chronic aortitis analogous to those set up by these diatheses. Clinically, the process is decidedly chronic, because the intoxication is slight and often intermittent; but when these toxic substances are given to animals progressively, in large doses, and over prolonged periods of time, the intensity of the process is augmented: thus, areas of aortitis, with or without previous traumatism, have been observed in guinea-pigs intoxicated with uric acid, white lead, and phloridzin. In man, as in animals, a previous alteration of the aorta favors and localizes the action of microorganisms, of toxins, and of intoxications. Experimentally, as well as clinically, these etiologic factors mutually assist each other. The combination of these factors explains the frequency in the human subject of chronic aortitis, which often originates from the infectious diseases (typhoid fever, the eruptive fevers, malaria, syphilis, etc.), from the diatheses (gout, rheumatism, etc.), and from the intoxications (alcoholism, saturnism, etc.). [Hitherto not enough attention has been given to acute processes in arteries, and credit is due to the French writers for their researches in this field.]

Tuberculous Aortitis.—H. Stroebe,¹ at an autopsy on a youth of 16, dead of miliary tuberculosis, found in the aorta, 2½ cm. above the sinus of Valsalva, a polyp 7 mm. long and 3 to 4 mm. thick, caseous in the center, and evidently developed from a tuberculous process in the intima of the aorta. Although giant-cells and typical miliary tubercles were absent, tubercle-bacilli were present in abundance. The infection of the aorta was probably from the circulating blood passing over the vessel; the miliary tuberculosis had its origin in caseous bronchial glands.

¹ *Centralbl. f. allg. Path. u. path. Anat.*, viii., S. 998, 1897.

Rupture of the Aorta without Aneurysm or Atheroma.—F. A.

Packard¹ reports a spontaneous transverse rupture of the aorta, 2 in. above the aortic valve, in a man 72 years of age. The pericardium was filled with blood. The aorta was flabby and could readily be torn; on microscopic examination it showed advanced fatty degeneration. Rupture of a nonaneurysmal aorta is more frequent in men than in women. Of a total of 129 cases, 90 were in the male and 39 in the female sex. As to age, it is most frequent between 30 and 60, but has occurred at 16 and beyond 80 years. In about 58% of the cases the rupture occurred in the pericardial portion of the aorta. Death may take place instantaneously or be delayed for days (23 days in Gordon's case). Death is due either to hemorrhage *per se* or pressure of the blood on the nerves or the heart directly.

Rupture of the Aorta with Flap-like Dissection.—J. D. Steele²

reports a case of partial rupture of the aorta occurring 3 cm. above the aortic valve. A flap 2 cm. wide had been dissected up at the inner posterior aspect of the aorta. The aorta was the seat of an extensive atheroma. Microscopic examination showed that the intima at the point of rupture was very much degenerated.

Sydney Philips³ reports a case of calcareous change of the tracheal lymph-glands, leading to mediastinal abscess and the formation of bronchial fistula and perforation of the arch of the aorta, in a man aged 36 years.

Pathologic Closure of the Large Arteries Arising from the Arch of the Aorta.—Goodkind and Eisendrath⁴

report a case of closure of the left common carotid and left subclavian arteries, through atheromatous process, in a man aged 40, a victim of syphilis. The symptoms before death had strongly suggested aneurysm of the right subclavian artery and of the arch of the aorta at the point at which the left subclavian and the left carotid arise. No aneurysm, however, was found; and, despite the closure of the left subclavian, numbness, pain, coldness and pallor, and edema were absent. Nor did the occlusion of the left common carotid produce any prominent cerebral disturbance.

Thrombosis of the Portal Vein.—Rorrmann⁵ states that primary thrombosis of the portal vein cannot properly be said to exist. The disease depends either on inflammatory processes in the neighborhood of the vein extending to its wall, or upon lesions that exert pressure upon it. Syphilis may also be an eticologic factor. Of the 20 cases collected (2 of them his own), 4 were due to syphilis, 3 to chronic peritonitis in the neighborhood of the portal vein, 1 to gall-stone, and 1 to enlarged lymph-glands. In 1 there was compression by a gumma, and in 1 a combination of causes. In 7 of the remaining cases there were sclerotic changes in the wall of the veins. The author strongly insists on the frequency of venous sclerosis, and believes that there is a primary sclerotic and atheromatous disease of the wall of the portal veins, and in some cases of the neighboring veins, that may lead to thrombosis, and may probably be regarded as an infection independent of the disease of the liver. If the thrombosis is obliterative, death occurs rapidly; if partial, life may be prolonged for a considerable time, although there is usually more or less hepatic cirrhosis.

Experimental Researches on the Relation of Nerve-lesions to Changes in the Vessels.—Czyhlarz and Helbing⁶ have made some

¹ Proc. Path. Soc. of Phila., N. S., vol. i., No. 9.

² Ibid., No. 8.

³ Lancet, Oct. 30, 1897.

⁴ Chicago Med. Recorder, Aug., 1897.

⁵ Deutsch. Arch. f. klin. Med., Dec. 9, 1897.

⁶ Centralbl. f. allg. Path. u. path. Anat., Nov. 1, 1897.

interesting studies on this subject. Bervoets found, after section of the sciatic nerve, the following changes in the arteries of the paralyzed extremity: (1) atrophy and degeneration of the smooth muscle-cells in the peripheral layers; (2) a progressive hypertrophy of the same cells in the central layers of the middle coat, on account of which the lumen is gradually diminished. These changes the author had connected with the lesion of the nerve. A. Fränkel divided or resected the sciatic nerve in dogs and rabbits and examined parts of corresponding arteries in the two limbs. He found a marked hyperplasia of the 3 coats of the affected artery, and likewise of the companion-veins. In all the animals the extremity, the sciatic nerve of which had been cut, was the seat of abrasions, ulceration, or mummification, which was more or less extensive in different animals. The authors, in their experiments, divided the right sciatic nerves of 7 rabbits, killed the animals after a variable period, and examined the posterior tibial arteries and veins of the healthy and the operated extremities. The results proved interesting. The arteries from the extremities which had been the seat of ulceration showed marked changes analogous to those found by Bervoets and Fränkel, while in those in which ulceration had not taken place the arteries presented no changes of the intima; whence it follows that the intimal changes described by the aforesaid authors were not dependent on the nerve-lesion, but were a consequence of the ulcerative processes. It is well known that in the neighborhood of ulcers endarteritis and endophlebitic processes are apt to take place; but it also appears that such changes may affect the more distant portions of the related vascular territory. Regarding the sequence of changes in the affected arteries, the authors are of the opinion that the process begins in the media, and consists in primary degenerative changes in the muscle-cells, which are followed by hyperplasia of the elastic elements of the middle coat.

Calcification of the Pericardium.—Calbert and T. S. Pigg¹ report a case of calcification of the pericardium, the result of chronic pyopericardium.

Endocarditis in Tuberculosis, Particularly that Form due to the Bacillus of Koch.—G. Étienne² has seen endocarditis in 5 cases of tuberculosis. In 2 of these he demonstrated the tuberculous nature of the endocardial vegetations. One case was that of a girl, aged 15 years, in whom the mitral valve, the aortic semilunar valves, and the tricuspid valves presented vegetations which, on bacteriologic examination, did not show the tubercle-bacillus. Injection of fragments of the vegetations into the peritoneal cavity of a guinea-pig produced tuberculosis, with the presence of bacilli. In the second case, that of a woman, aged 38 years, the mitral and tricuspid valves bore vegetations which, when inoculated into the peritoneal cavity of a guinea-pig, produced general tuberculosis. The other cases presented vegetations on the mitral valve. In these no bacteriologic examinations were made, except in one, which did not show the presence of tubercle-bacilli. In this case, however, no animal inoculation was made. Macroscopically the valvular lesion may be typically tuberculous, or it may present the usual appearance of endocarditis.

A Contribution to the Study of Acute Endocarditis.—Peter F. Holst³ reports a case of malignant endocarditis in which a micrococcus was found in the blood before death and in the diseased valves after death. This organism is not identical with any of the species known at present.

Reticulation, or Net-formation, in the Right Auricle of the

¹ Lancet, Nov. 6, 1897.

² Arch. de Méd. expér. et d'Anat. path., Jan., 1898.

³ Ibid., July, 1897.

Heart.—H. Chiari¹ reports 11 cases of a very interesting cardiac anomaly, consisting in the presence of a delicate network inserted in the wall of the right auricle. In 1 case this reticulum was the starting-point of a thrombosis, which led to embolic obstruction of both pulmonary arteries. Chiari explains this net-formation as the remains of the valvule venose of the sinus reuniens.

Hypertrophy of the Heart as the Result of Arterial Sclerosis and Hypertrophy as the Result of Contracted Kidneys.—Arthur Hasenfeld² has carefully investigated the blood-vessels, with the view of determining to what extent arteriosclerosis will, of itself, cause hypertrophy of the heart. He finds that the hyperplasia of the connective tissue of the intima occurs physiologically in the splenic, hepatic, and superior mesenteric arteries, while a moderate arteriosclerosis is not uncommon in the vessels of the abdominal viscera. Pronounced changes are less frequent than in the arteries of the extremities and in the brain and the aorta. Hypertrophy of the left ventricle occurs only when the visceral arteries exhibit an extreme degree of sclerosis, or when the thoracic aorta is sclerotic. In cases of contracted kidney without marked arteriosclerosis all the chambers of the heart are hypertrophied; if, however, extreme arteriosclerosis is present also, the left ventricle is disproportionately enlarged. In those cases of general arteriosclerosis in which the peripheral arterioles are unaffected the heart seems to escape entirely. The author finally concludes that the hypertrophy that occurs in cases of contracted kidney is due to some cause that increases the work of both ventricles, and perhaps irritates the heart directly.

The Behavior of the Left Ventricle in Diseases of the Mitral Valve.—R. Oestreich³ controverts the statement so frequently made that in mitral stenosis there is a tendency to atrophy of the left ventricle. By careful examination in a large series of cases of mitral stenosis as well as mitral insufficiency, he comes to the conclusion that there is in mitral stenosis generally a normal left ventricle. If the ventricle is small the cause is not the valve-disease. Mitral insufficiency depends for its compensation chiefly upon the left auricle and right ventricle, to a less extent on the left ventricle; and hypertrophy of the left ventricle is not absolutely necessary; moderate dilatation is frequently observed. While there is in mitral insufficiency a greater filling of the left ventricle there is also an abnormally rapid emptying, since the blood is carried off in two directions. The author believes that some cases of hypertrophy of the left ventricle can be explained by retraction, by which the chordæ tendineæ, the papillary muscles, and the ventricular walls are brought more closely to the auriculoventricular orifice. This retraction disturbs the contraction of the papillary muscles and the part of the ventricle in which they are inserted, and by thus increasing the labor of the ventricle leads to hypertrophy.

Mitral Stenosis.—D. W. Samways⁴ has analyzed the postmortem records of Guy's Hospital for 10 years, and has found in 4791 necropsies 196 cases of mitral stenosis. In 108 cases the orifice admitted one finger easily; in 85 cases it did not; 3 cases were indeterminate. The average age of death for both sexes was 38½ years, and of the cases of severe stenosis 33.6 years. In 32 cases there was hypertrophy, the heart weighing 20 oz. or more. In 32 cases tricuspid stenosis was an associated condition, and in 4 cases the tricuspid orifice measured less than 3 in., and in 28 between 3 and 4 in. in circumference. In 22 cases of severe stenosis it is spoken of as greatly dilated. In 24

¹ Ziegler's Beiträge z. path. Anat. u. allg. Path., Band xxii., Heft 1, 1897.

² Deutsch. Arch. f. klin. Med., Dec. 9, 1897; Phila. Med. Jour., Jan. 22, 1898.

³ Virchow's Archiv, Band cli., S. 189.

⁴ Brit. Med. Jour., Feb. 5, 1898.

cases the right ventricle is described as considerably hypertrophied, and in 16 dilated. The left ventricle was generally normal or small. Pericarditis had occurred in nearly one-third of the cases, and often there was an unusual quantity of fluid in the pericardium. Sudden death occurred in at least 7 cases. It appears also that a presystolic murmur is heard sometimes during the course of the disease in about three-fifths of all the cases, and a thrill may be detected in about one-third. [These researches in the main confirm those of Oestreich, detailed above.]

Tuberculosis of the Myocardium.—Alfred Hand¹ reports 2 cases of myocardial tuberculosis in children. In the first there was a pearly tubercle on the left side of the septum ventriculorum; in the second a tuberculous mass the size of a hickory-nut was found at the apex in the wall of the right ventricle. Microscopic examination showed caseous necrosis and small round-cell infiltration, with giant-cells. A few tubercle-bacilli were found in the second case.

Incomplete Rupture of the Right Ventricle, with Adherent Pericardium.—David Hunter² reports the case of a married woman, 72 years of age, with extensive fatty infiltration and degeneration of the heart and adherent pericardium; there was partial rupture of the wall of the right ventricle. [The majority of cases of rupture of the heart have occurred in the left ventricle.]

Aneurysm of the Heart.—Joseph Sailer³ describes a heart with two ventricular aneurysms. One had ruptured into the pericardial sac. The author considered the aneurysms due to an idiopathic myocarditis.

Gummata of the Heart in a Case of Congenital Syphilis.—E. R. Le Count⁴ found a gumma, about 1 cm. in diameter, on the anterior surface of the heart in a new-born infant. It involved the entire thickness of the ventricular wall; 3 similar but smaller areas were situated on the posterior or diaphragmatic surface.

Primary Sarcoma of the Heart.—Lambert⁵ reports a primary sarcoma of the heart which in places had almost completely replaced the wall. The pancreas was secondarily involved.

THE NERVOUS SYSTEM.

Colloid Degeneration of the Brain.—Alzheimer⁶ describes the occurrence of colloid degeneration, using the term in the wide sense of von Recklinghausen, in 2 brains; one in a man with a syphilitic history, the other in a man who had been subject to convulsions. The colloid material stained brown with iodine, not changing to blue on the addition of acid; it stained with carmin, eosin, acid-fuchsin, and Weigert's fibrin-method, and was soluble in boiling water and alkaline solutions.

Peculiar Bodies in the Central Nervous System.—D. L. Edsall and Joseph Sailer⁷ observed peculiar bodies in sections of small papillary elevations found in the floor of the lateral ventricles in a case of tuberous gliosis. The bodies stained deep blue with Delafield's hematoxylin, deep brown with Weigert's stain, clear red with Van Gieson's and Rosin's stain, and red with gentian-violet. They did not stain with iodine. The tissue had been hardened in Müller's fluid. The authors consider the bodies as modified corpora amyl-

¹ Proc. Path. Soc. of Phila., N. S., vol. i., No. 4.

² Lancet, Dec. 18, 1897.

³ Proc. Path. Soc. of Phila., N. S., vol. i., No. 2.

⁴ Jour. Am. Med. Assoc., Jan. 22, 1898.

⁵ N. Y. Med. Jour., Feb. 28, 1898.

⁶ Arch. f. Psych. u. Nerv., Band xxx., Heft 1.

⁷ Proc. Path. Soc. of Phila., N. S., vol. ii., No. 4.

acea. In the second case, one of tuberculous meningitis, with degeneration of the left internal capsule, irregular round masses were found, staining a bluish-purple with Delafield's hematoxylin, reddish-violet with thionin, and not staining with Van Gieson's or Rosin's stain or with carmin or iodine. The tissue had been hardened in alcohol. They consider the bodies in the second case to be the products of destruction of the myelin-sheaths of the nerves.

Amyloid, Colloid, Hyaloid, and Granular Bodies in the Central Nervous System.—Wm. G. Spiller,¹ in a case of Landry's palsy, found a large number of amyloid bodies in the spinal cord. The bodies stained a light purple with Delafield's hematoxylin, and a reddish-brown with Lugol's solution, which changed to a purplish color on the addition of a little sulphuric acid. They were not exactly the same as the amyloid bodies found elsewhere in the body, nor like those of the prostate gland. In a case of amyotrophic lateral sclerosis the author and Dereum found formations somewhat larger than the amyloid bodies, with a pale central core surrounded by a more deeply stained circle, that did not stain with Delafield's hematoxylin, methyl-green, or acid-fuchsin. They were especially numerous within the medulla and within the perivascular spaces, but extended also into the surrounding tissues. With gentian-violet and with Lugol's solution they stained like the adjacent tissues, although they could be detected. The author believes that they resemble the colloid bodies found by Bevan Lewis. In a case of tumor at the base of the brain, which had produced symptoms of acromegaly during life, hyaloid bodies, irregular in shape, of concentric arrangement, and variable in size were also present. They stained brown with Weigert's hematoxylin, pink with eosin, purple with thionin, pale pink with carmin, deep purple with Delafield's hematoxylin, red with acid-fuchsin, yellow with iodine, purple with gentian-violet, and reddish-brown with Van Gieson's stain. They were not dissolved by boiling water, acids, or alkalies. Spiller believes that they are thickened blood-vessels.

Contribution to the Study of Regeneration of Tissues in the Central Nervous System.—Tedeschi² produced wounds in the cortex of animals and studied the regenerative changes. The effect of the injury was the production of a well-marked degenerative process, eventuating in part in necrosis. The adjacent tissues showed, however, proliferation of the neuroglia-cells, the endothelial cells of the vessels, and the ganglion-cells. The multiplication of endothelial cells led to the formation of capillaries, and that of the neuroglia to the formation of glia-tissue, which constituted the chief constituent of the scar. Unquestionable karyokinetic figures were seen in some of the ganglion-cells. The leukocytes did not participate in the scar-formation. After variable periods of time nerve-fibers were also found in the scar. Whether these were newly formed or preexisting could not be determined. Tedeschi is sceptical with regard to the function of the newly-formed ganglion-cells.

Joseph Sailer,³ in a repetition of Tedeschi's work, lacerated the brain of a cat with a sterile platinum wire and killed the animal in 72 hours. The path of the wire was filled with blood. In the immediate neighborhood of the lacerated tissue there appeared to be no increase in the number of neuroglia-cells, the tissues not staining at all. There was no accumulation of leukocytes. Just beyond this zone capillaries could be seen pushing their way toward it, and in this area neuroglia-cells were slightly more numerous than in normal tissue. The ganglion-cells were extensively degenerated. The neuroglia-fibers were

¹ Proc. Path. Soc. of Phila., N. S., vol. ii., No. 9.

² Ziegler's Beiträge, Band xxi., S. 42.

³ Proc. Path. Soc. of Phila., N. S., vol. i., No. 3.

thicker and the meshes much larger in the area of injury than elsewhere. From these studies the author concludes that after aseptic laceration of the central nervous system there is a prompt increase in the neuroglia to take the place of the destroyed tissue. This increase is chiefly manifested by a thickening of the fibers; a slight proliferation of the neuroglia-cells occurs just beyond the area of direct injury, and it is possible that it is from these that the fibers project. There is also a regeneration of the vascular supply, just as occurs elsewhere. The ganglion-cells in the area of destruction degenerated completely; no karyokinetic figures were observed.

The Influence of Various Infections upon the Nerve-cells of the Spinal Cord.—V. Babes¹ describes the changes observed in the nerve-cells of the spinal cord during different infectious diseases. In animals killed soon after recovery from various infections the anterior horns of the cord show distinct changes: chromatolysis, displacement of the nucleus, and pericellular proliferation. In animals killed later these degenerated cells are less numerous, and the conclusion seems justified that many of the cells regenerate. In various infectious diseases other changes, such as multiplication of cells around the blood-vessels, small hemorrhages, and microorganisms, may be observed. Rarefaction, vacuolation of the nerve-cells, or a kind of coagulation-necrosis or edema of the cell-body and nucleus may be present. In virulent infectious diseases the changes are very marked. Nissl's granules disappear and leave a colorless network containing vacuoles and some dark, diffuse spots. In the case of the plague, bacilli are found. Of all the chronic infections, leprosy, especially the tuberous form, is most apt to cause nervous changes. The bacteria are generally found in the midst of pigment. Chromatolysis, vacuolation, and separation of the chromophilic bodies and disappearance of the pigment may all be observed. In the nervous form the changes are similar, but the bacilli cannot be found. The author believes that they were present, but disappeared. A comparison between tetanus and hydrophobia indicates clearly the difference between intoxication and direct microbial action on the nerve-cells. In the former the cells show hyaline or vacuolar degeneration; in the latter, hemorrhagic and inflammatory changes about the central canal and early involvement of the cells of the posterior roots. Rabies is the type of true infection of the nervous system. It leads to pericellular, cellular, and nuclear changes. The first consist of nodules of products of degeneration leukocytes, and endothelial cells. The cell-protoplasm is darker and more homogeneous, and the chromophilic substance is collected in the neighborhood of the nucleus. The influence of the different infectious diseases is variable; microorganisms may be present without much injurious effect, while in other cases toxins produce marked changes. The lesions, however, in no instance are specific and characteristic, but present the same changes in different degrees of severity. [The nonspecificity of the nervous lesions is only in line with what has long been known of the changes in the other organs in infectious diseases. The degenerative and necrotic changes observed are not pathognomonic.]

Contribution to the Subject of the Diseases of the Central Nervous System in the Acute Infections.—Eugene Fränkel,² in an important communication on this subject, reports in detail 2 cases of influenza-meningitis, 1 of pneumococcic and 1 of anthrax-infection. The first patient, a male child, 10 weeks old, was admitted with diarrhea and signs of bronchitis. There were no meningeal symptoms. At the autopsy lungs, heart,

¹ Berlin. klin. Woch., Jan. 3, 10, and 17, 1898.

² Zeit. f. Hyg. u. Infectiönskr., Band xxvii., Heft 3, 1898.

and abdominal organs were normal. A large quantity of pus was found beneath the dura and between the pia and the arachnoid. In places the arachnoid was torn and lay in shreds over the pus-covered cerebral cortex. The ventricles were somewhat dilated. The ependyma was smooth. The fluid contained a few purulent flocculi. The tympana were normal. Teased preparations of the brain presented, aside from a few granule-cells, nothing remarkable; but in stained cover-glass preparations from the meningeal pus an enormous number of delicate, short rods, frequently intracellular, were found. Glycerin-agar tubes inoculated with the pus remained sterile; while inoculations on blood-agar gave small dew-drop-like colonies consisting of bacilli identical with those found in the pus. The bacteria did not stain by Gram's method, and were beyond a doubt influenza-bacilli. Histologic study showed that the exudate occurred in the subarachnoid space, and had separated the soft membranes widely. The venous vessels of the pia were engorged with blood; the arteries presented nothing abnormal. The tissues of the pia showed an increase in spindle-cells, and this was also true of the arachnoid. The exudate proper was very cellular. The brain-cortex adjacent to the exudate showed nothing significant. The second case, a male child, 9 months old, was received with signs of bronchitis and mucoid stools. Spasm of the extremities, strabismus, unequal pupils, vomiting, and convulsions set in. A diagnosis of tuberculous meningitis was made. At the autopsy it was found that on the convexity of the brain, between the soft membranes, there was a thick, yellow, partly fluid exudate, which in the region of the posterior right hemisphere attained the thickness of $\frac{1}{2}$ cm. There was also an exudate at the base, in the region of the pons and the medulla. Pus was found in the tympanic cavities; the walls of which, however, were normal. The spinal cord was also covered posteriorly with a thick exudate. Inoculations were successful only on blood-agar, and resulted in the growth of influenza-bacilli. Microscopically it was shown that the exudate was entirely between the pia and the arachnoid. The left lung at the apex and the posterior surface of the upper lobe were firmly adherent to the chest-wall.

The first case was, then, one of purulent meningitis without other influenza-focus in the body, and in view of the preponderating involvement of the frontal lobes the author assumes that the infection travelled up from the nasal chambers. Attention is called to the peculiar condition of the arachnoid, which in places was torn and allowed the exudate to enter the subdural space. The disease-processes occurred primarily between, not on, the membrane. For the demonstration of the bacteria in tissue the author employs Unna's polychrome methylene-blue, with differentiation in glycerin-ether; the best results were obtained by staining with polychrome methylene-blue, and, after treatment with tannin-orange or tannic acid, with fuchsin and glycerin-ether equal parts. Bacilli were only found in the exudate, and bore no relation to the tissue of the membranes or the brain-substance.

In the second case one might be inclined to look upon the middle-ear disease as the primary lesion; but the author rejects this, first, because in infants with pedatrophy purulent otitis media is an almost constant feature without there being any affection of the brain or membranes; and, secondly, the otitis media of influenza is usually not purulent, but hemorrhagic, and has a tendency early to penetrate the tympanic membrane. Since the child had bronchitis, it is reasonable to assume that this was grippal in nature. Regarding the postmortem diagnosis, the author holds that it is not possible either by macroscopic or simply microscopic study to differentiate between a cerebro-spinal meningitis due to the *diplococcus pneumoniae*, the *diplococcus Jäger-*

Weichselbaum, or the bacillus influenzae. Only bacteriologic study will differentiate.

The third case, a boy, 21 months old, had empyema, for which resection of the rib was done and a third of a liter of pus removed. The child died. At the autopsy the right lung was found for the greater part adherent; over the free part there was some pus. Over the convexity of the right hemisphere there were hemorrhagic foci penetrating into the brain-substance. Microscopically the cellular exudate was here also between the soft membranes. The veins were filled to bursting with blood, and red corpuscles were also found in the adventitial lymph-paths. Some of the perivascular lymph-spaces were filled with diplococci of pneumonia. Interesting in this case was the absence of any clinical signs pointing to meningitis, and the author advises that in every case of pneumonia the brain be examined. Important also is the demonstration of the distribution of bacteria—they were distributed not along the blood-vessels, but along the perivascular lymph-spaces.

The last case described by the author concerned a laborer in hides, who developed anthrax. At the autopsy the leptomeninx was found edematous and diffusely dark red. The central convolutions were dotted over with small punctiform hemorrhages, which could also be traced into the white matter. Microscopically a great deal of pigmentary deposit was found in the vicinity of the hemorrhages. An enormous number of anthrax-bacilli was demonstrated by Weigert's method in the membranes, which were entirely free from fibrin. Nowhere were the bacteria in the lumen of blood-vessels, but only in their walls. In the brain-substance in the region of the hemorrhages bacilli were found also, but only in the vessel-walls, not in their lumen. Inflammatory phenomena were entirely absent. In another case of anthrax bacilli could be demonstrated in a brain that showed no macroscopic changes, and the author thinks that these latter only occur when the bacilli get into the blood-vessels and lead to changes in their walls. Of interest, too, is the difference between the effects of the localization of the pneumococcus and that of the anthrax-bacillus. In the former true encephalitic phenomena are produced; in the latter, only hemorrhages. This is evidently ascribable to a difference in the metabolic products of the respective microorganisms.

Cerebral Concussion and the Histologic Changes Produced thereby in the Brain and Spinal Cord.—G. Scagliosi,¹ after an exhaustive review of the literature of cerebral concussion, which teems with conflicting views regarding the pathology, details his own experimental results. He produced a state of concussion in rabbits by striking them repeatedly on the head with a wooden hammer. Many animals were thus sacrificed, but 21 only could be utilized for the histologic studies. These latter showed that there were in all cases changes in the ganglion-cells of the brain, demonstrable both by Golgi's and Nissl's methods. Interesting was the discovery of alterations in the ganglion-cells of the spinal cord. The changes in the ganglion-cells of the brain were varicosity and atrophy, degenerative hypertrophy of the cell-body, chromatolysis, vacuolization, and even total destruction of the form of the cell. Similar changes occurred in the ganglion- and neuroglia-cells of the cord. The author believes that the changes depend on circulatory disturbances. These latter probably also cause metabolic changes that lead to a sort of autointoxication; the cell-disturbances may then be attributed to faulty nutrition, with autointoxication afterward superadded. [Although the experiments are somewhat crude (as well as cruel), they serve to throw light on an obscure subject, and will necessitate a change in the surgical

¹ Virchow's Archiv, Band clviii., S. 487.

text-books, where the pathology of concussion has always been unsatisfactorily treated.]

The Finer Nerve-changes in Infants suffering from Gastro-intestinal Disorders.—E. Müller and Manicardi¹ have examined the cells in the central nervous system of 7 infants, under 3 months of age, that had suffered from gastrointestinal diseases. In 5 of the cases there had been more or less high fever; the other 2 had been afebrile. In all of the 7 cases changes were found in the cells of the brain and of the spinal cord. The changes consisted, in the mildest type, in the irregular distribution of Nissl's bodies. Next in severity was the gradual solution of these, which affected the entire cell-body uniformly, or the parts about the nucleus, or the periphery. The solution was accompanied by a diminution in size and haziness of the Nissl bodies. Occasionally they were also enlarged and darker. In advanced cases they disappeared entirely and a fine fiber network appeared. Finally the cells lost their form, became indistinct, and the processes disappeared. The nucleus and the nucleolus were often displaced. The latter was enlarged, and the former was darker and uniformly stained. The presence or absence of fever seems to have no special influence. The changes just described belong to no special type, and resemble those which have been found in experimental intoxications and infections.

Lesions of the Central Nervous System in Experimental Uremia.—Danelli² performed double nephrectomy on rabbits. The animals lived for from 3 to 5 days. Golgi's method showed changes in the cells of the cerebral cortex (varicose atrophy of the processes), while Nissl's method demonstrated numerous lesions in the cerebellum and spinal cord (chromatolysis and displacement of the nucleus). The author does not believe that these lesions are characteristic of experimental uremia, as they are present in other intoxications; but there is nothing which would oppose the view that identical cellular lesions are found in uremia in man. [Very few studies of the finer nerve-changes in uremia have been made; it would be particularly interesting to investigate the cases of uremic hemiplegia described by Wilcox and others, in which the naked eye often discovers no gross lesion.]

Acute Degeneration of the Nervous System in Diphtheria.—J. J. Thomas,³ in a study of 12 fatal cases of diphtheria, found the following changes in the nervous system: 1. Marked parenchymatous degeneration of the peripheral nerves, sometimes accompanied by an interstitial process, and hyperemia and hemorrhages. 2. Acute, diffuse, parenchymatous degeneration of the nerve-fibers of the cord and brain. 3. No changes, or but slight ones, in the nerve-cells. 4. Acute parenchymatous and interstitial changes in the muscles, especially the heart-muscle. 5. Occasionally hyperemia or infiltration, or hemorrhage in the brain or cord, in rare cases severe enough to produce permanent troubles, such as the cases of multiple sclerosis or of hemiplegia which have been observed. It is stated as probable that the cases of sudden death from heart-failure in diphtheria during the disease or convalescence are due to the effects of toxic substances upon the nerve-structures of the heart.

The Pathology of Huntingdon's Chorea.—F. C. Facklam⁴ reviews the literature of Huntingdon's chorea, and reports 8 cases of his own, and 1 autopsy. The lesions in the last appeared to be inflammation of the mem-

¹ Deutsch. med. Woch., Mar. 3, 1898.

² Gaz. degli Ospedali e delle Clin., May 30, 1897; Gaz. hebdom. de Chir., Aug. 1, 1897.

³ Boston M. and S. Jour., pp. 76, 97, 123, Sept., 1897.

⁴ Arch. f. Psych. u. Nerv., Band xxx., Heft 1.

branes starting about the blood-vessels and extending into the cortex, and characterized by proliferation of the perivascular connective tissue and slight hemorrhage—that is to say, the lesions of chronic hemorrhagic meningoencephalitis with consecutive atrophy of the cortex. The peripheral nerves were normal, but there was marked proliferation of the nuclei of the muscle-cells, probably a functional result.

Changes in the Spinal Cord in Pernicious Anemia.—A. W. Campbell¹ reports a case of pernicious anemia in a middle-aged woman, with sclerosis of the posterior columns of the spinal cord, beginning in the lumbar region, in the center of the posterior columns, and broadening as it extended upward, so that in the cervical region it involved not only the posterointernal, but partly the posteroexternal columns.

Meningoencephalitis Hæmorrhagica.—Hermann Eichhorst² describes a subacute inflammation of the pia leaving free the surface of the convolutions, but involving the membrane in the sulci, and, by changes in the blood-vessels, causing alterations in the brain-cortex. The chief feature was an intense hemorrhagic infiltration of the affected parts. The condition occurred in a woman, 28 years old, who had had a possible syphilitic infection several years before.

The Etiology and Pathology of Multiple Sclerosis.—E. Redlich³ discusses this subject in a comprehensive summary, in which he exhaustively considers the literature. The article admits of but little condensation, and we refer the reader to the original.

Tumor of the Spinal Meninges.—A. F. Witmer⁴ reports a case in which the tumor covered and compressed the spinal cord in the region of the twelfth thoracic vertebra. The tumor did not involve the cord-substance. The growth was an endothelioma; no description of the microscopic appearances is given.

Medullary Localization of Tabes Dorsalis.—Philippe⁵ describes 2 types of tabes: one with lesions especially medullary and with destruction of the endogenous ascending and descending tracts of the posterior column; and a benign tabes, chiefly radicular.

Concerning the Changes in Nerve-cells in the Anterior Horns in Tabes.—Karl Schaffer⁶ ascribes the trophic changes of tabes, the amyotrophies, osteopathies, and arthropathies to alteration in the cells of the anterior horns. Hitherto cellular changes have not been observed to any extent in tabetic trophic changes. In the cases studied the changes were found in the peripheral nerves. Schaffer, however, discovered in a case of tabetic amyotrophies and arthropathies of the lower limbs, chromatolysis of the cells of the anterior horns of the lumbar cord. A study of additional cases led him to the conclusion that the tabetic atrophy is due to disease of the cells of the anterior horns; that the latter, in turn, is dependent on a loss of irritation transmitted through the posterior roots, the feeble resisting power of these motor cells, and the influence of a past syphilitic toxin. The tabetic muscular atrophy resembles that of spinal muscular atrophy, and this he regards as an argument in favor of the spinal origin of the former.

Degeneration of the Cells of the Anterior Horns of the Spinal Cord in Dementia Paralytica.—H. Berger,⁷ in 12 cases of paralytic dementia, found marked changes in the cells of the anterior horns, consisting

¹ Lancet, Dec. 18, 1897.

² Virchow's Archiv, Band cxi., S. 285.

³ Centralbl. f. allg. Path. u. path. Anat., Aug. 15, 1897.

⁴ Proc. Path. Soc. of Phila., N. S., vol. i., p. 2.

⁵ Arch. de Neurol., Sept., 1897.

⁶ Monats. f. Psych. u. Neurol., S. 64, 1898.

⁷ Ibid.

of pigmentary degeneration, karyolysis, destruction of the dendrites, tumefaction of the cells, chromatolysis, vacuolation, changes in the nucleus and nucleolus, etc. An interesting observation was a division of the nucleus of the cells into 2 parts without division of the cell-body, a feature which he regards as an incomplete regeneration of the cells. He has found changes in both horns of the cord after destruction of one pyramidal tract; but he was unable to find that lesions of this tract in the dog or cat, or of the posterior root in the dog, had any effect on the anterior cells of the cord. He attributes muscular atrophy seen in paralytic dementia to the cellular changes described, and states that such cellular lesions occur in the anterior horns in 83% of all cases of general paralysis. He considers the disease of the anterior cells as primary—that is to say, independent to a certain extent, at least, of degeneration of the white columns; that there is no constant relation between the degree of this cellular change in the cord and degeneration in the brain.

A Contribution to the Study of Human Neuroglia.—In an able paper, E. W. Taylor¹ discusses the nature of neuroglia and of tumors derived from it. The basis of his paper is the study of 2 gliomata. The first was a dense tumor replacing the basal ganglia of the left hemisphere, and associated with extensive cyst-formations and consequent distortion both of the cavities and the parenchyma of the brain. For purposes of staining, Mallory's

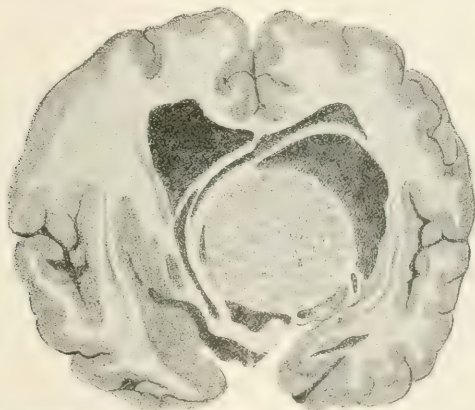


FIG. 57.—Frontal section—actual size—through tumor at its point of greatest development. Ventricular cavities are seen to be distinct from the cysts surrounding the tumor proper. The chief destruction has taken place in the left hemisphere (E. W. Taylor, in *Jour. Exper. Med.*)

differential stain proved most satisfactory. Microscopically the first tumor was composed largely of newly formed differentiated neuroglial fibers, without marked cellular proliferation. The condition justified the name glioma durum. The second tumor was a rapidly growing cellular glioma, with undifferentiated fibers. The fibers appeared to be still processes which might later have become differentiated. As regards neuroglia in general, it may be considered established (1) that there is a chemical difference between neuroglial fibers and the protoplasm of neuroglial cells; (2) that there is an enormous development of fibers

¹ *Jour. Exper. Med.*, Nov., 1897.

in adult neuroglia which bear no constant relation to the cellular elements; (3) whatever the relation of cells and fibers may be, the neuroglia acts within normal and pathologic conditions as connective tissue, in spite of its epiblastic origin. The points still in dispute are, first and most important, What is the relation of the fibers to the cells? and, secondly, If fibers are completely differentiated, how



FIG. 58.—Section through tumor, from Case 1. Mallory's modified fibrin-stain. Leitz oc. 3; obj. 3. Showing fiber-structure; probable lymph-spaces containing desquamated cells; preponderance of fibers over cells.

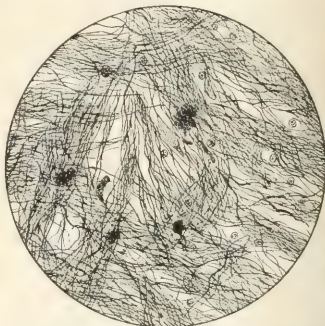


FIG. 59.—Section through the same. Mallory's modified fibrin-stain. Zeiss oc. 4; obj. 12. Showing fibers varying in size and occasional nuclei of neuroglia and desquamated cells.

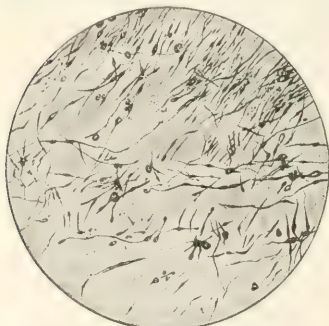


FIG. 60.—Section at edge of tumor, from Case 1. Weigert's rapid copper-hematoxylin method. Leitz oc. 3; obj. 5. Showing partially degenerated myelin-fibers. The background represents the infiltrating gliomatous tissue.

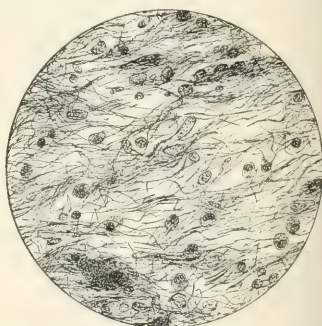


FIG. 61.—Section at edge of tumor, from Case 1. Mallory's phosphotungstic-acid-hematoxylin method. Zeiss oc. 4; obj. 12. Showing neuroglia-cells and fibers. In this section is shown the difficulty of stating dogmatically whether or not certain fibers stand in direct relation with the cells. The fibers here are finer and the cells more numerous than in sections taken from the central portions of the growth, and represent an older phase.

(E. W. Taylor, in Jour. Exper. Med.)

and at what stage of development do they become so? and as a corollary, Do we find cells that may be regarded as transitional forms? Weigert, it will be remembered, takes the view that fibers and cells are totally distinct; while Stroebe, though admitting as a possibility the complete differentiation of fibers, believes the old idea of cellular processes; and Taylor suggests it as probable that a middle ground between these two might be the correct one. The author is also

opposed to the term gliosarcoma, since a combination of two tumors of this kind is impossible; and he finally concludes as follows: 1. The term gliosarcoma should be dropped as unscientific and misleading in its significance. 2. The problems regarding neuroglia demand varied methods for their adequate study. 3. With all the means at our command, the absolute determination of the relation of the cells and fibers in individual cases remains difficult, and at times impossible. 4. No criterion has yet been offered, first, to determine a fundamental distinction between glioma and sarcoma (Stroebe); and, secondly, between glioma and so-called gliosis (Weigert). 5. The development of neuroglia, in all probability, is from cells with differentiated and independent fibers. 6. Herein lies a possible reconciliation of the conflicting views concerning the ultimate structure of human neuroglia.

The Relation of the Hypophysis to the Thyroid Gland.—I. Comte¹ has studied the hypophysis and the thyroid gland in 109 instances, and concludes that in all cases of degeneration of the thyroid the hypophysis shows changes of a hypertrophic or hyperplastic character, whence he infers that the hypophysis fulfils a vicarious role toward the function of the thyroid. In advanced pregnancy he has also seen hypertrophy and hyperplasia of the hypophysis.

Acromegaly.—At a meeting of the Pathologic Society of London, on Nov. 2, 1897,² a number of cases of acromegaly were reported. Turnivall's case was that of a man, 58 years old, in whom the sella turcica was deep and wide and the pituitary body was converted into a cyst containing a semifluid substance. The thyroid gland was slightly enlarged and altered in structure. No trace of the thymus gland was discovered. The sympathetic ganglia were normal. Except for some interstitial fibrosis of the kidney the other viscera were normal. The bones were thickened at the margins of the articulations and at the points of attachment of muscles and ligaments. The author gave an analysis of 34 recorded necropsies on cases of acromegaly, and said that changes of the pituitary gland had been found in all. The thyroid gland, examined in 24 cases, was normal only in 5, hypertrophied in more than half. The thymus gland was examined in 17 cases; it was absent in 7, hypertrophied in 3, and persistent in 7. The sympathetic ganglia were examined in 10 cases, and were reported as hypertrophied in 6. General enlargement of the brain and of the spinal cord had been noticed, and in 4 cases there had been degeneration in the posterior columns of the cord. The only constant associated changes appeared to be in the pituitary body, and the changes were not uniform and might occur without acromegaly. Rolleston showed a sarcomatous pituitary body from a case of acute acromegaly, in a man aged 35. The thymus was persistent. Lawrence also showed a pituitary body from a case of acromegaly. The gland was the size of a cherry, and showed slight degeneration of the anterior lobe. In a case of Dalton's, the pituitary body was considerably altered; but it had not as yet been decided whether there was sarcoma or mere hypertrophy of the gland. Smyth showed specimens from a case of acromegaly in which a large tumor in the pituitary body had been found. The thyroid gland had also been much enlarged. [The pituitary body has been found diseased in such a large proportion of cases of acromegaly, and so much more frequently than any other organ, that it would seem as if the disease of the hypophysis was the cause of acromegaly. Cases in which disease of the pituitary body existed without acromegaly prove nothing, unless it is shown that no part of the gland that could in any way functionate remained.]

¹ Beiträge z. allg. Path. u. path. Anat., Band xxiii., Heft 1, S. 90, 1898.

² Lancet, Nov. 6, 1897.

Explanation of the Reversal of the Law of Muscular Contraction in the Reaction of Degeneration.—Hugo Wiener¹ has made

a careful study of the electric reactions of muscle to determine the cause of the peculiarity of the reaction of degeneration. His conclusions are as follows: 1. In the ordinary polar stimulation of muscles there arises at the point of contact of the electrode one and on the two ends of the muscles two other electrodes of opposite polarity to the first. In other words, there is a peripolar stimulation. 2. This position of the electrodes at the ends of the muscles holds good for longitudinal fasciculated muscles and undergoes a modification in pennate muscles. The cathodal closure-contraction starts from the electrodes situated in the middle; the anodal closure-contraction, from the two cathodals situated at the ends. 3. The preponderance of cathodal closure-contraction in the normal muscles depends upon the fact that the cathodes producing it are situated at the point of greatest excitability and greatest current-density. 4. In the dying or degenerating muscle the conditions of excitability are changed, so that the point of nerve-entrance first loses its irritability, and this loss travels toward the two ends which remain longest excitable. 5. The reversal of the law of contraction in the degenerated muscles depends upon the fact that the cathodes which produce the cathodal closure-contraction and those which produce the anodal closure-contraction come to lie at the point of greatest irritability. It is necessary, in addition, that the difference in excitability between the ends and the middle be so much that it can no longer be compensated for by the greater current-density at the latter point.

DISEASES OF THE DIGESTIVE TRACT.

The Influence of the Soil on Dental Caries.—C. Röss² has examined the teeth of 20,000 recruits, and has noted the influence of drinking-water on them. The harder the water, the richer the soil in lime and magnesia, the freer were the teeth from caries; and conversely, the softer the water, the poorer the soil in lime and magnesia, the more liable were the teeth to be invaded by caries.

Accessory Thyroid of the Base of the Tongue.—Wiesinger³ found in a woman, 36 years old, a walnut-sized tumor at the middle of the back of the tongue, which was composed of thyroïdal tissue.

Tuberculosis of the Esophagus.—Claribel Cone⁴ has analyzed the recorded cases of tuberculosis of the esophagus on the lines of the classification suggested by Flexner, which is as follows: 1. Instances in which the tuberculous process arises through continuity or contiguity of structure: (a) where a caseous bronchial gland or group of glands becomes adherent to the esophagus and ulcerates into the latter; (b) in consequence of perforation of abscesses associated with caries of the vertebrae; (c) where tuberculous ulcers of the pharynx pass down and invade the esophagus. 2. Cases in which there exists in the esophageal mucous membrane a previous lesion, to be regarded as predisposing to the tuberculous infection. 3. Instances in which (a) the esophagus is affected in the course of a general disseminated miliary tuberculosis, and (b) in which there is infection of the mucous membrane from tuberculous sputum where no previous lesion existed. She reports an instance, observed by her, belonging to the last class. The case was one of generalized tuberculosis and Addison's disease. The esophagus in the lower two-thirds showed elevated

¹ Deutsch. Arch. f. klin. Med., Apr. 7, 1898.

² Münch. med. Woch., Jan. 18, 1898.

³ Deutsch. Zeit. f. Chir., Band xlv., Hefte 5 and 6, 1897.

⁴ Bull. Johns Hopkins Hosp., Nov., 1897.

dots and larger nodules in great numbers. None of these was caseous. The dots and nodules were enlarged lymphoid follicles invaded by miliary tubercles. Tubercle-bacilli were present in small numbers.

Columnar-cell Carcinoma of the Esophagus.—White¹ reported to the Pathological Society of London a case of columnar-cell carcinoma of the esophagus in a man of 47 years. The growth sprang from the anterior wall of the gullet, just above the cardiac orifice. [The vast majority of esophageal cancers are squamous in nature.]

Hyaline Bodies in the Gastric and Intestinal Mucous Membranes.—C. Thorel² has made a study of the hyaline globules recently described by Lubarsch and Hansemann in the mucous membrane of the stomach. These bodies present themselves as sharply defined spheres or ovoids, 20 to 24 μ in size. Some are flask-shaped or dumb-bell-shaped, rosette-shaped, or cordiform. Sometimes the spheres are agglutinated to form voluminous masses. The bodies probably belong to the same category as the oxyphile cells and the fuchsinophile epithelial cells of the stomach. The best opportunity for observing the hyaline bodies is given by the polypoid growths of the stomach and intestine. They stain red with Van Gieson's stain, bluish with Weigert's, brown with Biondi's, red with hematoxylin and eosin and with Kühne's and Russel's carbol-fuchsin solutions. In their nature the hyaline bodies are most closely allied to Russel's fuchsin bodies.

Miliary Tuberculosis of the Stomach.—M. Wilms,³ in the case of a child, 9 months old, that had died with symptoms of tuberculous meningitis, found miliary tuberculosis of the lungs, spleen, liver, and kidney, and tuberculosis of the bronchial glands. The mucous membrane of the stomach was slightly injected, but showed nothing abnormal to the naked eye; on microscopic examination the entire mucous membrane was found in an inflammatory state with outwandering of leukocytes. In addition to the leukocytosis, there were found in the mucosa, partly in its depth, partly in its middle and near the surface, small necrotic foci, about 1 mm. in diameter, consisting chiefly of leukocytes and without giant-cells. On staining, enormous numbers of tubercle-bacilli were demonstrable in the foci, whence it follows that they were miliary tubercles of the gastric mucous membrane. The tubercles had nothing to do with the follicles of the mucosa, and were, of course, a secondary infection.

Infiltrating Carcinoma of the Stomach.—L. Hektoen⁴ reports a case of infiltrating carcinoma of the stomach in a man of 45. The stomach was very small, weighing only 150 gm., and the posterior wall near the esophagus was very thick. There seemed to be a diffuse infiltration, leading to a thickening of the coats of the organ.

Primary Sarcoma of the Stomach.—Brooks⁵ reports a case of primary multiple sarcoma of the stomach following a gunshot-wound. Of the 15 cases of primary sarcoma collected by the author from the literature, 6 were round-cell sarcoma, 4 spindle-cell, 2 myosarcoma, 2 of uncertain type; 1 reported as a lymphosarcoma was probably a perithelioma. The author's is apparently the only case in which injury antedated the development of the growth.

Bacteria in Progressive Cirrhosis of the Liver.—Adami,⁶ while investigating the so-called Pietou cattle-disease of Nova Scotia, found a specific

¹ Lancet, Apr. 23, 1898.

² Virchow's Archiv. Band cli., S. 319.

³ Centralbl. allg. Path. u. path. Anat., Band viii., S. 783.

⁴ Jour. Am. Med. Assoc., June 11, 1898.

⁵ Med. News, May 14, 1898.

⁶ Montreal Med. Jour., July, 1898; Lancet, Aug. 13, 1898.

microorganism in the form of a diplococcus. At times it was a stumpy bacillus; at others it was a diplobacillus and resembled to some extent the microorganisms of hemorrhagic septicemia in the lower animals, but, unlike them, it had a faint capsule. It grew upon all ordinary media, and was pathogenic for rabbits, guinea-pigs, and mice. This discovery suggested to the author, in view of its close histologic similarity to Pictou cattle-disease, an investigation of human hepatic cirrhosis, and he succeeded in finding in stained sections of a large number of livers, more or less advanced in cirrhosis, a peculiar bacillus occurring as a very minute body, best visible with oil-immersion lenses of from $\frac{1}{18}$ to $\frac{1}{20}$ in. focus. The organism presented itself as an ovoid bacillus or as a minute diplococcus surrounded by a distinct halo. The bacilli were present in greatest numbers in the liver-cells, but were also found in the new connective tissue, and sometimes along the lymphatic capillaries, but so far have not been found in the bile-ducts. The sections, both of Pictou disease and of human cirrhosis, are prepared by staining the tissues with carbol-fuchsin and bleaching them afterward in sunlight. The author had no difficulty in securing cultures of the organism in the cattle-disease; and, after many efforts, also succeeded in growing it from a case of cirrhosis of the liver, in a woman 56 years of age. In broth it assumed a diplococcus-form; on agar, that of a short or long bacillus. It was obtained not only from the liver, but also from other organs. The author asks to have his observations confirmed by other investigators, and suggests it as probable that the microorganism causes not only cirrhosis of the liver, but also other hepatic diseases, as well as diseases of the kidneys and other organs.

Malignant Adenoma of the Intestines.—H. L. Williams¹ reports a case of malignant adenoma of the intestines, basing the diagnosis on: 1. The atypical adenomatous glands. 2. The absorption of the stroma and agglutination of the glands or loops of the same gland. 3. Proliferation of the lining epithelium of the glands. 4. Filling of the gland-spaces, rupture of the lumen of the gland, and proliferation of the epithelium into the surrounding stroma. [The term malignant adenoma is open to serious objection; while in parts of such tumors the resemblance to adenoma is striking, there are nearly always fields in which a complete or partial filling of the lumen occurs from a proliferation of the epithelial cells; moreover, careful examination often reveals penetration of epithelial elements into the stroma, with the formation of solid nests. Probably it is better to use the term adenocarcinoma, as expressing more precisely the two chief features of these growths—the adenomatous and the malignant features.]

Carcinoma of the Cecum.—A. C. Morgan² reports a case of carcinoma of the cecum that had fused with and ruptured into the duodenum.

Carcinoma of the Rectum, with Miliary Carcinosis of the Peritoneum.—D. Riesman³ reports a case of carcinoma of the rectum arising from the mucous membrane above the portion covered with squamous epithelium. Histologically the growth was a simple or medullary cancer, with solid masses of epithelial cells filling the spaces of the stroma. The peritoneum was the seat of miliary carcinosis. The author believes that in miliary carcinosis the rapid proliferation of cells throws into the circulation metabolic products that are harmful, and that a condition of "metabolic toxemia" is thereby produced.

Meckel's Diverticulum and the Omphalomesenteric Duct.—D. Riesman,⁴ in an autopsy on a man who had died of chronic colitis, found a fibrous cord, 11 cm. long, passing from the peritoneal surface of the umbilicus

¹ Proc. Path. Soc. of Phila., N. S., vol. i., No. 4.

³ *Ibid.*, No. 4.

² *Ibid.*, No. 8.

⁴ *Ibid.*, No. 8.

to the lower part of the ileum. He considers this to have been the remains of the omphalomesenteric vessels. In connection with this case he discusses the malformations resulting from the persistence of parts or of the whole of the omphalomesenteric duct, which are classified as follows: 1. Persistence of the proximal part of the duct—Meckel's diverticulum. 2. Persistence of the entire duct as a patulous canal. 3. Persistence of the distal part of the canal—that connected with the navel. 4. Persistence of the part of the duct near its middle. 5. Persistence of the omphalomesenteric vessels. From a study of the consequences of the persistence of these parts the author concludes that: 1. Persistence may affect the proximal part of the duct, the distal part, the entire duct, the more central parts, or the blood-vessels. 2. The dangers of Meckel's diverticulum are perforation from ulcerative processes and foreign bodies, strangulation and intussusception of the intestines. 3. Strangulation is most likely to occur when the diverticulum is adherent, and is most common in the male sex and in early life. 4. Persistence of the entire duct may lead to fecal fistula, to prolapse of the duct, or to prolapse of the bowel, with strangulation. 5. Persistence of the vessels, with or without persistence of part of the duct, very often leads to strangulation of the intestines.

Strangulation of the Small Bowel by a Thread-like Band.—

John B. Roberts¹ reports a case of strangulation of the bowel by a small thread-like band, 13 cm. long, attached at one end to the parietal peritoneum on the front of the abdomen, and at the other to the mesentery above the upper portion of the constricted bowel. [It is very probable that this band was the remains of the omphalomesenteric vessels.]

Körte² reports a case of **persistent omphalomesenteric duct in a boy 1 year old.**

Chronic Hyperplastic Perihepatitis.—Hübner, Sr.,³ reports a case of chronic perihepatitis (Zuckergussleber of Curschmann) in a woman 46 years old. The peritoneal covering of the liver was greatly thickened; there were recent verrucose endocarditis, moderate icterus, and congestion of the spleen. [The true nature of the condition described by Curschmann, to which we referred in the YEAR-BOOK for 1897, is not understood. Some cases are probably due to what the Italians have called *polyserositis*, or general inflammation of the serous membranes.]

Clinical Forms of Hepatic Cirrhosis.—Ribas y Perdigo⁴ divides cirrhosis of the liver, clinically, into a protopathic group and a deuteropathic group. In the first group he places alcoholic cirrhosis, biliary cirrhosis, mixed or total cirrhosis, senile cirrhosis, and toxic cirrhosis. To the second group belong capsular cirrhosis and the cirrhosis due to cardiac disease, to syphilis, to gout, to malaria, to diabetes, to the acute infectious diseases, to dyspepsia, and to occlusion of the bile-passages.

Intercellular Hepatitis.—Manuel Carmona y Valle⁵ reports under this name a variety of cirrhosis of the liver which is peculiar to Mexico. It resembles the hypertrophic biliary cirrhosis of Hanot.

Clinical Forms of Cirrhosis of the Liver.—A. Gilbert and H. Surmont⁶ classify cirrhosis as simple and as complicated. The two varieties differ in that a complicated cirrhosis presents some form of degeneration of the hepatic cell. Simple cirrhosis may be subdivided into the toxic, the infectious, and the mechanic forms. Toxic cirrhosis may be due to autointoxication: cirrhosis due to dyspepsia, gout, or diabetes; or to heterointoxication: cirrhosis

¹ Proc. Path. Soc. of Phila., N. S., vol. i., No. 2.

² Deutsch. med. Woch., Feb. 17, 1898.

³ Berlin. klin. Woch., Dec., 1897.

⁴ Gaz. hebdom. de Méd. et de Chir., Sept. 12, 1897.

⁵ Ibid.

⁶ Ibid.

due to bacteria, lead, or alcohol. Infectious cirrhosis may follow the eruptive fevers (particularly measles and typhoid fever) and cholera, malaria, syphilis, and tuberculosis. Hypertrophic cirrhosis with jaundice (Hanot) and cirrhosis from obstruction of the bile-passages also belong to this group. Mechanic cirrhosis is best represented by that form of the disease following chronic cardiac lesions. Complicated cirrhosis may be attended by fatty degeneration, amyloid degeneration, necrobiosis, pigmentary degeneration, diffuse or nodular hyperplasia, or adenoepitheliomatous change. [This is a very good division from the etiologic point of view, and is a step toward a much-desired goal—the proper classification of forms of hepatic cirrhosis.]

Chauffard¹ thinks that the analysis of the different types of cirrhosis of the liver should be made with reference, in each particular case, to the anatomic process, the pathogenic cause, and the evolution of the lesion. Three conditions must be present in order to constitute a cirrhosis of the liver: (1) General and diffuse interstitial proliferation; (2) the formation of adult fibrous connective tissue, rich in elastic fibers and possibly cicatricial; and (3) a tendency, at a given time in the evolution of the lesion, for the hepatic cells to become involved. Bearing these requisites in mind, and the fact that compensatory hypertrophy is the rule in hepatic pathology, three groups of cases may be distinguished: (1) Those in which the compensatory hypertrophy is insufficient or is masked by the more or less rapid destruction of the glandular elements, as in Laennec's cirrhosis; such cases die in a very short time. (2) Those in which the compensatory hypertrophy is sufficient to allow the patient to live for a long time, but not long enough to be cured; the sclerogenic process continues, grave secondary icterus appears, and death supervenes, as in the hypertrophic biliary cirrhosis of Hanot. (3) Those in which the compensatory hypertrophy persists long enough for an apparent cure to take place, as in the cases of hypertrophic alcoholic cirrhosis of Hanot and Gilbert. The action of the pathogenic agent must be of long duration and relatively mild in intensity for a cirrhotic process to supervene. The sclerogenic process, up to a certain point, is a protective and defensive one for the liver-cells. The cells themselves participate in the evolution of the morbid process, either by compensatory hypertrophy or by degeneration and destruction. The clinical form of the cirrhosis depends upon the action of the cells. Moreover, in the course of evolution of an hepatic cirrhosis other organs may become involved, such as the kidney and the heart. Finally, hepatic cirrhosis may be only one part of a general disease such as is set up by alcohol or by the microbic toxins.

Primary Carcinoma of the Liver.—W. M. L. Coplin² reports a case of primary carcinoma of the liver somewhat peculiar in its histologic features. The nodules in the liver presented various characters, a number having features, somewhat irregularly, of cylindric epithelioma, others being glandular in type; still other nodules presented the typical appearance of scirrhous carcinoma.

W. E. Hughes³ reports a case of **carcinoma of the common bile-duct and head of the pancreas**. The gall-bladder was very much enlarged.

Primary Carcinoma of the Gall-Bladder.—D. Riesman⁴ reports a case of primary carcinoma of the gall-bladder, with extensive secondary involvement of the liver. The tumor was a cylindric epithelioma with an abundant development of fibrous stroma. The secondary growths were of the same

¹ *Gaz. hebdom. de Méd. et de Chir.*, Sept. 12, 1897.

² *Proc. Path. Soc. of Phila.*, N. S., vol. i., No. 9.

³ *Ibid.*, No. 5.

⁴ *Ibid.*, No. 1.

type. The gall-bladder was reduced in size, adherent to the liver, and contained a gall-stone. The author calls attention to the association of gall-stones with primary cancer.

Hemorrhagic Pancreatitis.—J. Hlava¹ reports 3 cases of hemorrhagic pancreatitis and 1 of fat-necrosis. He thinks that the so-called hemorrhagic pancreatitis is only a hemorrhagic infiltration and necrosis of the interstitial tissue and of the parenchyma of the pancreas, with a consecutive alteration of the blood and of the tissue, and that the inflammation is secondary and insignificant. The bacillus coli communis was found in the case of fat-necrosis and in 2 of the cases of pancreatic hemorrhage. The author thinks that the condition may be produced in one of three ways: First, as a hemorrhagic infarct of the pancreas, due to embolism or thrombosis; second, as a necrosis of the pancreatic tissue, due to infection and to consecutive hemorrhage; and third, to a primary toxic action with subsequent digestion. In the last instance he thinks that the gastric juice is carried into the canal of Wirsung and produces both the thrombosis of the vessels and the subsequent necrosis. He has demonstrated this action of hyperacid gastric juice experimentally on dogs, and thinks that it is also responsible for fat-necrosis.

Suppurative Pancreatitis.—G. Etienne² reports the case of a man, an alcoholic, who was suffering from subacute enteritis, probably due to the colon-bacillus. By a consecutive ascending infection, the microorganisms passing up the excretory duct, a suppurative, polymicrobial angiopancreatitis was established. Although this infection was polymicrobial, the colon-bacillus was found in greatest abundance. The pancreatitis had given rise to a localized peritonitis by the opening of some of the suppurating acini into the peritoneum. There was a general infection due to the colon-bacillus, which also produced an abscess of the spleen. The author has studied 27 cases of suppurative pancreatitis. The disease may be produced by ascending infection, by infection through the circulation, or by the extension of suppurative lesions to the pancreas by continuity from neighboring tissues. An ascending pancreatitis may be produced if the termination of the duct is widely opened, if there is any obstacle to the flow of the secreted fluids, or if pathogenic microorganisms are carried directly into the canal of Wirsung from the duodenum. Infection of the pancreas may come through the blood-paths in general pyemia or as the result of a pyelephlebitis. Infection by extension by contiguity has been seen in cases of gastric ulcer and duodenal ulcer. The pancreas at autopsy may present diffuse suppuration or a localized abscess. Diffuse suppuration results principally from an ascending infection. There is a general or localized angiopancreatitis affecting, in greater or less degree, the branches of the canal of Wirsung. A single abscess or a few localized abscesses may be produced by the angiopancreatitis of an ascending infection, or they may result from infection through the blood-paths.

Fat-splitting Ferment in Peritoneal Fat-necrosis, and the Histology of the Necrotic Lesions.—Flexner³ has experimented on cats and dogs with a view of producing fat-necrosis. The best results were obtained after ligating the veins and lacerating the pancreas. The necroses varied in extent and size from that of a pin's head to that of a pea. The smaller ones were yellow or white and opaque; the larger sometimes hemorrhagic. The fat-splitting ferment was demonstrable at certain stages of the process, being present in the greatest amount early, and disappearing later. Although it cannot be confirmed that steapsin was the direct cause of necrosis of the tissue, such

¹ Gaz. hebdom. de Méd. et de Chir., Aug. 22, 1897.

² Arch. de Méd. expér. et d'Anat. path., Mar., 1898.

³ Jour. Exper. Med., July, 1897.

an assumption is rendered highly probable by its constant occurrence in diseased areas and its absence from healthy fat, and the nature of the pathologic changes. The escape of the pancreatic secretions into the peri- and parapancreatic tissues is the origin of the necrosis. This escape is chiefly the outcome of lesions of the pancreas, but also of disturbances in its circulation. Two cases of human fat-necrosis were studied. In the first, a woman of 50, the autopsy-findings were gall-stones in the common duct, dilatation of the duct above the concretions, dilatation and distention of the gall-bladder, jaundice, disseminated peritoneal fat-necrosis, moderate chronic diffuse nephritis. In this case incrustations with lime, which are usually present, were absent. The center of the opaque areas was occupied by fatty-acid crystals. Just outside of the completely necrotic foci in the center was a cellular infiltration, evidently a reactive inflammation. The second was a man, 56 years of age, a heavy, periodic drinker. At the autopsy biliary (hypertrophic) cirrhosis of the liver, ascites, chronic diffuse nephritis, lobular pneumonia, general passive congestion of the viscera, and multiple foci of the fat-necrosis in the pancreas were found. In this case the evidences of the proliferation of the fixed connective tissue were very marked. The pancreas, in case of fat-necrosis, suffers in two ways: it undergoes necrosis in the same way as the adipose tissue, or it is invaded by new growth of connective tissue, not limited strictly to the field of necrosis. In this way small nodules characteristic of interstitial pancreatitis, with a loss of parenchyma, may be formed.

Fat-necrosis.—M. Simmonds¹ believes that the pancreatic changes in fat-necrosis are primary, and reports a case of gunshot-injury of the abdomen in which the pancreas had been injured, and in which celiotomy was performed for the control of hemorrhage. The peritoneum was normal. Death occurred 36 hours later, and extensive fat-necrosis was found throughout the abdominal cavity. The bullet had pierced the pancreas and caused extensive destruction of its tissue. The parenchymatous changes in the other organs pointed to an infectious process, and a variety of bacteria was found on the peritoneal surface; but as the autopsy had been performed some hours after death, these findings had no significance. H. U. Williams² ligated the pancreas in 3 cats, and smeared the surface with agar-cultures of staphylococci and streptococci. Fat-necrosis occurred in all cases. Portions of fresh pancreas were introduced into the subcutaneous adipose tissue of cats. Out of 11 animals in which suppuration did not occur, 6 showed fat-necrosis, as did also 2 in which cultures left doubt as to infection. The author concludes that some substance in the pancreas, probably the fat-splitting ferment, is capable of causing changes similar to fat-necrosis.

Sarcoma of the Pancreas.—E. Piccoli³ reports 2 cases of sarcoma of the pancreas. The first was an alveolar large round-cell sarcoma; the second, a giant-cell sarcoma. In the first case the gall-bladder was enlarged and there was a secondary nodule at the papilla of Vater. In the second case the gall-bladder was not enlarged. In both there was metastasis to the liver. [The occurrence of a giant-cell sarcoma in the solid viscera is very rare; the author's drawing leaves no doubt as to this case.]

Some Experiments on the Solubility of Gall-stones in Oils.—Lindley Scott⁴ made a series of experiments on gall-stones with olive-oil, almond-oil, and parolein. He found that the stones were freely soluble at the temperature of the body. The rate of solubility was inversely proportional to

¹ Münch. med. Woch., Feb. 8, 1898.

² Boston M. and S. Jour., Apr. 14, 1898.

³ Ziegler's Beiträge z. path. Anat. u. z. allg. Path., Band xxii., Heft 1, 1897.

⁴ Brit. Med. Jour., Sept. 5, 1897.

the size of the stone—that is, the large ones took a much longer time to dissolve than the smaller ones.

Streptococcus-enteritis in Infants.—J. L. Hirsh,¹ in a case of fatal enteritis in a female child, 8 months old, found in the stools an almost pure culture of streptococci. The same organisms were also found in the gastric contents, in the blood, and in the urine. They grew best in sugar-bouillon. Sections from the small intestine showed abundant streptococci, which could be followed into the lymph-paths of the peritoneum. The organisms were only pathogenic for white mice. E. Libman² reports 2 other cases of streptococcus-enteritis in infants.

Experimental Ligation of the Common Bile-duct in the Dog.—Lucien Lamacq,³ in an experimental study of the effects of ligation of the common bile-duct in the dog, found that sometimes infectious nodules existed in the liver before experimental intervention. Such nodules interfere with the results of experimental operations. The necrotic areas are increased by metastasis through the blood-capillaries. If a single ligature is applied the course of the bile is not completely arrested and the experiment is a failure, because ascending infection is almost certain to take place. After aseptic section of the common bile-duct between 2 ligatures there is no development of connective tissue; there are no newly formed biliary canaliculi; karyokinetic figures do not appear in the hepatic cells, although they may be seen in the cells lining the bile-passages; and there is no venous thrombosis.

DISEASES OF THE RESPIRATORY TRACT.

A Possible Morphologic Basis of Some Diseases of the Lungs.

—Woods Hutchinson⁴ rejects all the theories that have hitherto been advanced to explain the vulnerability of the lung as compared with that of other organs, and believes that it is to be explained by the fact that the lung is, in a morphologic sense, one of the youngest organs that man possesses, all other organs, with the exception of the uterus and the mammary gland, having an ancestral history 5 or 10 times that of the lung. [We cannot follow the author in his entertaining speculation, for while the lung may be subject to tuberculosis to a greater extent than the other organs, it is probably less liable to disease in general than, for example, the arteries or lymphatic glands. It seems also that the vulnerability of the lung is related more to infection-opportunity than to evolutionary juvenility.]

The Origin of Hemorrhagic Infarction of the Lungs.—Orth⁵ is of the opinion, as a result of experiments recently made in his laboratory, that disturbances in the pulmonary circulation lead to infarction, and that such a disturbance may, contrary to the view of Grawitz, be produced by embolic obstruction of the branches of the pulmonary artery, although this is probably not alone sufficient for the production of hemorrhagic infarction. Another factor is necessary, and this is to be found either in congestion of the pulmonary circulation or in the chemically or bacterially irritant character of the embolus. Two series of experiments were made by him. In the first he injected bland emboli into the pulmonary artery of dogs in which he had effected a valvular heart-lesion. In the second he produced embolism with chemically irritant substances, such as particles of formal-gelatin containing salt or solution of chlorid of iron, or with particles of paraffin, vaselin, or vasogen. He was

¹ *Centralbl. f. Bakt., Parasit. u. Infek.*, Oct. 12, 1897.

² *Ibid.*

³ *Arch. de Méd. expér. et d'Anat. path.*, Nov., 1897.

⁴ *Med. Rec.*, July 31, 1897. ⁵ *Centralbl. f. allg. Path. u. path. Anat.*, Nov. 1, 1897.

able to produce with the chemically irritant emboli dark hemorrhagic foci resembling hemorrhagic infarction in the human lung. The inflammatory changes of the lung which Grawitz held to be a cause of pulmonary infarction were not present in the experimental infarctions. In the second series of experiments—the injection of bland emboli into dogs with artificial valvular lesions—infarctions were also produced. In some instances local edema served to obscure the infarction.

Akira Fujinami¹ has also made a careful experimental study of the much-disputed study of hemorrhagic infarct of the lungs, and concludes that the infarct is the consequence of circulatory disturbance of the pulmonary capillaries. In animals the infarct can only be produced mechanically provided the embolus is in a certain position and the mode of occlusion is a special one. The human infarct is also dependent upon disturbances of the pulmonary circulation. The direct cause of this disturbance is occlusion of afferent vessels by emboli; but other points must be considered. Hemorrhagic infarct occurs chiefly in adults who have more or less chronic pulmonary disease, in consequence of which the pulmonary circulation suffers. The development of embolism coincides with other affections having a harmful influence on the circulation of the lung and aiding in the production of the infarct. This is the reason why in animals many more emboli and a more complicated method of occlusion are necessary than in man.

DISEASES OF THE URINARY ORGANS.

The Passage of Solid Particles from the Bladder into the Kidneys and Distant Organs.—L. Lewin² shows that when the bladder is capable of contracting an ascent of the vesical contents is possible, both after the injection of fluids and after prolonged artificial retention. The pressure-conditions in the bladder are, if the ureteral opening is well closed, not the sole controlling factor—a return-flow can occur with moderate pressure or remain in abeyance when the pressure is maximal. How the opening of the ureteral orifice is brought about is not known. At times the return-flow of the vesical contents is so rapid that its phases cannot be distinguished; at others a distinct peristalsis is visible. When the vesical contents reach the renal pelvis there is often a descending peristaltic wave which forces part of the material back into the bladder. That these phenomena also occur in man cannot be doubted. The author applies them to the explanation of the harmful effects that sometimes follow irrigation of the bladder, and in explanation of the ascending infection in recent cystitis, of urine- or catheter-fever, of acute pyelitic symptoms occurring in acute posterior gonorrhea, etc. Solutions reaching the pelvis are either absorbed from the latter or enter the kidney and thence the blood-stream.

Huber held that the renal pelvis had no absorptive power. Lewin does not consider that this is proved. The author's most recent experiments were made to determine whether insoluble bodies after injection into the bladder or in cases of retention reached the kidneys, and, if so, in what manner. He found that the ascent occurred under varying states of filling of the bladder, either during or shortly after the injection. It is probably to be explained on an irritation of the ureters, the lower end of which is rich in ganglion-cells, whereby the mouth is opened. As soon as opening has taken place the difference in pressure between the bladder and the airless ureter and pelvis can lead

¹ Virchow's Archiv, Band clii., S. 61 and 93.

² Arch. f. exper. Path. u. Pharmacol., Band xli., S. 287, 1897.

to further transportation of the fluid in a purely physical way or by reverse peristalsis. The quality of the bladder-contents probably also plays a role. Ascent is most frequent along both ureters; if not along both, then generally along the left. Clinically, however, the right kidney is more often diseased. A second point determined was the route of dissemination taken by the solid particles after they had reached the kidney. It was found that the solid particles entered directly into the tubules, but more abundantly into the lymphatics, and thence into the blood-vessels. The third point dealt with was whether solid particles can pass from the renal pelvis into the blood and thence to distant organs. Lewin proved that this was possible by finding diatoms and ultramarine that he had injected in clots in the right ventricle, in the lungs, and in the liver. This shows a direct communication between the bladder and the heart which renders it possible for solutions and solid particles to pass in a reverse direction. Lewin¹ also shows that air can pass from the bladder to the heart if injected under pressure, especially along the lymph-paths, then along the blood-vessels, and least along the tubules. [These researches are of practical importance, and serve to explain ascending urinary infection.]

Congenital Hydronephrosis.—D. Riesman,² in an infant less than 3 days old, found dilatation of the pelvis and ureter of the right side from obliteration of the vesical end of the ureter. The ureter, for a distance of 1 cm., was converted to an impervious fibrous cord. The causes of hydronephrosis, congenital and acquired, are discussed.

GENERAL PATHOLOGIC PROCESSES.

A Contribution to the Knowledge of Histolysis.—W. Noetzel³ discusses the phenomena occurring during the development of echinodermata and tunicata and in the atrophy of the tail of the tadpole, for which Metchnikoff has made phagocytosis responsible. For his own studies he employed the blue-bottle fly, the development of which he carefully studied, and is brought to the conclusion that phagocytosis is not the chief factor, but that the changes in the larva are brought about by the body-fluids, which lead to an histolysis; all that the leukocytes do is to ingest the detritus that has resulted. [If these observations are confirmed, they will deprive the phagocytic theory of a strong support.]

The Chemistry of Amyloid Degeneration.—N. P. Krawkow⁴ has found chondroidin-sulphuric acid, according to Oddi the chief constituent of amyloid substance, in a recently removed fibroma, in the aorta, and in the ligamentum nuchæ. It was also found in some of the tissues of invertebrates; and it would appear that it is found in cartilage and in all such tissues as are rich in elastic elements. The method of isolating is described at length. The amyloid substance, in a fairly pure state, is easily soluble in weak alkalies, with difficulty in concentrated acids, and contains a trace of phosphorus, which is attributable to an admixture of nucleins. Regarding the color-reactions, the author shows that the iodine-reaction depends on the physical state of the amyloid substance, and is less valuable than that with the aniline-dyes. The isolated amyloid responds to the latter, but not to the former. Amyloid, according to these investigations, is a firm ester-like combination of chondroidin-sulphuric acid and an albumin. It is present normally in the body, and Krawkow found it in the aorta of the horse. The demonstration of its pres-

¹ Arch. f. exper. Path. u. Pharmacol., Band xl., S. 308, 1897.

² Proc. Path. Soc. of Phila., N. S., vol. i., No. 9.

³ Virchow's Archiv, Band cli., S. 7.

⁴ Arch. f. exper. Path. u. Pharmacol., Band xl., Hefte 3 and 4, S. 195, 1897.

ence in arteries is especially significant, since amyloid degeneration frequently affects the vascular system.

The Etiology of Amyloidosis.—Julius Nowak¹ was able to produce amyloid disease by means of injections of various bacteria. Better results were obtained in chickens than in rabbits. The staphylococcus was injected into 7 rabbits; in 3 suppuration occurred, and in 2 of these amyloid was found in the spleen. In the chicken amyloid was obtained in 2 in which suppuration had taken place. The bacillus pyocyaneus was injected into 2 rabbits and 2 chickens without suppuration occurring. The former showed no amyloid; the latter did. The bacillus coli did not produce amyloid. Putrefying bouillon gave good results in chickens, but not in rabbits. The toxins of the various bacteria also produced amyloid degeneration. Turpentine was injected into rabbits and produced extensive phlegmons, leading to amyloid disease. In chickens amyloid degeneration was also induced. Krawkow's researches have shown that amyloid is a chemical combination of chondroidin-sulphuric acid and an albumin. It is the former constituent that causes the characteristic reactions. The author thinks, however, that there are other substances in amyloid besides the two mentioned. [Krawkow, as mentioned above, has shown that amyloid is a normal constituent of elastic tissue, especially of that of the blood-vessels.]

Focal or Insular Necrosis Produced by the Bacillus of Tuberculosis.—While the usual effect of the tubercle-bacillus upon tissue is to produce a tubercle with exudative and proliferative changes, the primary effect may in exceptional instances be one of necrosis combined with exudation and resulting fibrin-formation. This feature of the tubercle-bacillus is illustrated by the studies of E. R. Le Count.² In 3 cases he found areas of focal necrosis like those described in abrin- and ricin-poisoning, in diphtheria, eclampsia, blood-serum intoxication, typhoid fever, lobar pneumonia, and glanders. He does not give his adherence to any one theory of the origin of these necroses. They are probably not due to ischemia; they may result from mixed infection with pyogenic bacteria, although none was found in staining. It is possible that a diminished resistance on the part of the tissues, incidental to the marasmus present in the cases, was an important factor in the production of the necrotic lesions.

Fibrinous Exudate and Fibrinoid Degeneration.—H. R. Gaylord,³ working in Orth's laboratory, undertook an experimental study of fibrin-formation on serous membranes, in order to discover to what extent Neumann's view of a fibrinoid degeneration is correct. He was unable to verify that observer's statement that at the beginning of the exudative process on serous membranes no cell-demarcation exists. The more recent the condition the more perfectly preserved was the epithelium, both in simple and in septic pleurisy and pericarditis. The author introduced fibrin taken from the blood into serous cavities of animals, and observed that it became organized in the usual way that fibrinous exudates are organized, and that it presented at every stage the same features as are found in the human body. The fibrin introduced as such, and fibrin-forming fluids when injected into the serous cavities, became adherent to the serous membrane. The endothelium remained intact until the process of organization began. The endothelium has the power to proliferate sufficiently to cover large areas, and this proliferation was found in all experiments after the sixth day. It was possible to find endothelium preserved below the fibrin and the surface of the latter covered by an endothe-

¹ Virchow's Archiv, Band clii., S. 162.

² Jour. Exper. Med., Nov., 1897.

³ Ibid., Jan., 1898.

lial layer, the result of proliferation of the sides. It may be concluded that the presence of endothelium overlying the fibrinous mass does not constitute proof that the fibrin was produced beneath it. Neumann, it will be remembered, held that the endothelium covering the serous exudate was the pleural endothelium in its original anatomic position, and that the fibrin was the result of the degeneration of the connective tissue lying beneath it. He excluded the possibility of the fibrin being produced by exudation below the endothelium. The arrangement of the cells and nuclei in rows in the mass is not proof, as Neumann and others have maintained, that they are the remaining connective-tissue nuclei and owe their arrangement to this fact. The author seems to favor the older theory—viz., that the cells are leukocytes that were present when the fibrin was in a fluid condition, and that they owe their arrangement to the process of coagulation.

S. Abramow¹ produced a fibrinous exudate in the pleura of mice by injecting a solution of iodine in potassium iodid. He was able to demonstrate the presence of the endothelium under the fibrin-pellicle, and the boundary between the pleura, and the latter was always distinct. The fibrin is the result of a coagulation of a serous exudate, the coagulation being produced by the degeneration-products of necrotic endothelial cells. The first deposit of fibrin takes place on the free surface of the necrotic cells, the fibrin surrounding the latter as in a network. The exudate, which continues to be poured out on the surface, forms new deposits, which lift up the old. In this way thickening of the pellicle is produced. The formation of the fibrin cannot, however, depend exclusively on necrosis of the endothelium, as in that case it would not obtain any great thickness. It is very probable that the red corpuscles participate, but to a less extent than the endothelial cells. [On page 741 of the YEAR-BOOK for 1897 we abstracted Neumann's article on fibrinoid degeneration. Neumann's work has started a very interesting controversy, which in some instances has even assumed an acrimonious character. It is too early to pass judgment, but it is possible that we shall have to recognize a fibrinoid degeneration of connective tissue as well as a coagulation-necrosis of exudates, as shown in Abramow's experiments.]

The Migration of Cells into the Dead Cornea.—Lange² introduced cornea which had been soaked in formol into the subcutaneous tissue and peritoneal cavity of rabbits. He invariably found cells in the cornea; and there is no other explanation for the origin of these cells than that they came from the surrounding tissues. In another experiment the cornea of an ox, after it had lain for 2 weeks in a 10% solution of formol, 5 minutes in pure formol, and for the same length of time had been boiled in pure acetic acid, and then washed for a day in running water, and into which a solution of croton-oil and olive-oil had then been injected, was introduced into the abdominal cavity of a dog. Nineteen days later the cornea was found reduced in size, soft, and disintegrating at the edges; the corneal corpuscles could no longer be seen. The center of the cornea was free from cells, but near the margin and extending for a variable distance into the cornea were numerous darkly staining cells. On horizontal sections these cells were arranged in peculiar lattice- and spear-shaped forms. [There can be no doubt from these observations that the cells found in the cornea were immigrated cells, and these experiments strongly disprove Grawitz's theory—*vide infra*.]

F. Saxer³ has made a large series of experiments, which we need not give in detail, for the purpose of determining the source of the cells found in dead

¹ Beiträge z. path. Anat. u. z. allg. Path., Band xxiii., Heft 1, 1898.

² Centralbl. f. allg. Path. u. path. Anat., Aug. 15, 1897.

³ Ibid., vol. viii., Oct. 15, 1897.

cornea introduced into animal tissues. Suffice it to say that in every instance cells were found in the dead cornea, and the proof seems positive that the cells were immigrated wandering cells and leukocytes. [The bearing of these studies and those of Lange quoted above on the subject of inflammation is of great importance. In the YEAR-BOOK for 1898, p. 705, we detailed the experiments of Grawitz, according to whom the inflammatory cells found in the cornea have an autochthonous origin and develop from the corneal corpuscles and from the intercellular substance (Schlummerzellen). In commenting on Grawitz's article we expressed the belief that his experiments admitted of another interpretation than that given by him, and the researches of Saxer and Lange prove this conclusively. Lubarsch also believes that the cells are invandered cells, and that they are not formed in the cornea.]

TUMORS.

The Paths of Dissemination of Malignant Tumors.—Goldmann¹ has made an admirable study of this subject, which has yielded important results. The blood-vessels, both in sarcoma and carcinoma, are involved by the new growth. The changes in the veins are of 3 kinds: 1. The obliterating, frequently organized tumor-thrombus, with complete degeneration of the wall. 2. Endophlebitis carcinomatosa, in which the lumen and endothelium of the vein may be preserved for a long time, while the carcinoma spreads intramurally. 3. The circumscribed breaking of carcinoma-cells into the veins, in which process coagulation-phenomena in the blood may be absent. In the arteries, which are much more rarely affected, carcinoma occurs in the form of periarteritis carcinomatosa, of a carcinoma-thrombus, with complete destruction of the wall, and in the form of circumscribed ruptures into the lumen; carcinomatous endarteritis was not observed. The tumor-particles gained access to the walls through the vasa vasorum. The same vascular lesions as in the primary tumors were demonstrated in the lymphatic and visceral metastases and in recurring tumors.

The Formation of Glycogen and Pigment in Sarcoma of the Choroid.—The chief interest of this most excellent paper² lies in the general considerations which the author gives to the subject of tumors arising from endothelium. The text of the paper is a pigmented sarcoma of the choroid, with extension to the optic nerve, chiasm, and the base of the brain. Its structure varied considerably in the different localities, but in all it was characterized by necrosis and hemorrhages, by absence of pigment in the sarcoma-cells proper, while the stroma was deeply pigmented; and by the presence of glycogen in the sarcoma-cells. The sarcoma-cells, which were free from pigment, had a large, vesicular nucleus, with from 1 to 3 nucleoli. Many nuclei presented evidences of degeneration; others showed karyokinetic figures. In stained sections the glycogen appeared in the form of finer or coarser, homogeneous, slightly refractive drops or globules lying between the cells. The drops gave the iodine-reaction and were soluble in saliva. The tumor was intimately connected with the blood-vessels. The perithelial hyperplasia produced varying appearances, according as it arose from the perithelium of capillaries or from that of the adventitia or perivascular lymphatics. The hemorrhagés were dependent on the sarcomatous infection, as the author terms

¹ Beiträge z. klin. Chir., Band xviii., Heft 3; Centralbl. f. allg. Path. u. path. Anat., S. 697, 1897.

² Beiträge z. path. Anat. u. z. allg. Path., Band xxiii., Heft 2, 1898; Univ. Med. Mag., Sept., 1898.

it, of the blood-vessels. By perithelium is understood the endothelium of the perivascular lymph-spaces. Such spaces have so far only been demonstrated in the brain, choroid, and testicle. But the author believes that in view of the similarity of the tumors arising from them, the perithelia of the capillaries and the flat adventitial cells of the larger vessels are equivalent to the endothelia of the lymph-vessels. But not all "perivascular" tumors are endotheliomata; spindle-cell sarcomata springing from the connective-tissue cells of the adventitia are, of course, to be excluded. The author disapproves of the tendency toward a morphologic classification of tumors represented chiefly by Hansemann, and wishes due weight to be given to histogenesis. Endotheliomata and carcinomata, on this basis, are to be sharply separated; the former have close relations with sarcomata. Morphologically, endotheliomata are characterized by an alveolar structure, which may arise in different ways. First, it may result directly from a hyperplasia of the endothelium of lymph-sheaths and lymph-capillaries, which usually leads to plexiform appearances. A second source is the penetration of the endothelium into blood-vessels and its further growth there. A third variety is difficult of interpretation—namely, that in which endothelial cell-masses are permeated by capillaries, with or without formation of supporting tissue. Intercellular tissue, when present, is quite characteristic of the endothelioma; it forms a delicate reticulum, the meshes of which enclose from 1 to 3 cells. This stroma is, however, not formed by the endothelial cells, but has its own nuclei. The presence of glycogen is almost specific for the endothelial nature of the tumor as against other sarcomata. In hardened sections it appears either as small drops or crescents in the protoplasm or diffused. It is never found in the nucleus, and but rarely in the stroma. Glycogen has been found in many varieties of tumors. Regarding its presence in certain tumors of the kidney (Grawitz's tumor), the author does not think that this is an argument in favor of the view that these tumors represent hyperplastic aberrant suprarenal tissue (since the adrenal is free from glycogen), but demonstrates rather their endotheliomatous nature. The presence of glycogen in cells is not to be considered a retrogressive phenomenon, since it is very abundant in cells with mitotic figures, which seem to be uninfluenced by it. The pigment of the tumor of the choroid was not melanin, but of blood-origin; and it was suggestive that glycogen was most abundant where diapedesis of red corpuscles was most marked. Despite the abundance of pigment about them the endothelial cells contained none, but only glycogen, which leads Best to suspect that the endothelial cells might have the faculty of forming glycogen out of the constituents of red corpuscles (hemoglobin). It is possible, analytically, to derive glycogen from hemoglobin. Glycogen, the author considers, is a valuable biologic index of endothelial cells, and that among the sarcomata it is only found in endothelioma. Its origin in endothelioma is probably hematogenic. In conclusion, he distinguishes 3 types of endotheliomata: 1. The interfascicular, or plexiform. 2. The alveolar and cylindric. 3. The more perivascular forms. The cells resemble epithelia and contain hematogenic glycogen.

Structure and Multiplication of Sarcoma-cells.—A. Trambusti¹ has made a careful study of the cells in a melanotic sarcoma arising from a birthmark on the arm. He was able to distinguish 2 types of cells, those with resting nucleus and those with dividing nucleus. The cytoplasm in the first group varied in different cells, and contained fine or coarse granules or fibrils. The pigment was so abundant that, with the exception of the nucleus, it filled the entire cell. Glycogen was not found. Two types of giant-cells were

¹ Ziegler's Beiträge z. path. Anat. u. z. allg. Path., Band xxii., Heft 1, 1897.

present: in one the nuclei were of normal size and had a moderate amount of chromatin; in others they were atrophic and poor in chromatin. The nuclei of the sarcoma-cells had a distinct nuclear membrane and one or more nucleoli. Numerous hyperchromatic cells were present. According to the author, true hyperchromatism depends on asymmetric karyokinesis; in all other cases increased chromatin means the beginning of chromolytic processes. Hyperchromatic cells have no special importance in sarcoma; they may be found in carcinomata and in regenerative hyperplasias. Of the cells with dividing nuclei, a few only showed karyokinetic changes. The majority divided by direct division. Asymmetric, multipolar, as well as pathologic karyokineses were found. The amitotic division of the nucleus of the sarcoma-cells begins in the nucleolus and then passes on through the nucleus. Direct division seemed to occur only in those cells which had a small amount of chromatin; while karyokinesis took place in cells rich in this substance. The attraction-sphere seemed to exert no influence on amitotic division. In the majority of cases the cell-protoplasm did not take part in the division, and giant-cells with numerous small nuclei were produced. The author believes that, in his case at least, amitotic division had for its object not the multiplication of the cell-species, but preservation of the cell-individual.

Mastzellen in Tumors.—A. E. Taylor¹ reports a case of spindle-cell sarcoma, involving the sacral and pelvic regions, containing myriads of mastzellen, which were best stained with thionin and toluidin-blue. M. Osthimer² found large numbers of basophile cells in an adenoma of the cervix uteri and in a cancer of the breast.

D. Riesman,³ in a case of carcinoma of the pylorus, a cylindric epithelioma, found large numbers of mastzellen in sections of the tumor. The cells were found especially in the muscular tissue, in the intermuscular planes, and in the areas of round-cell infiltration lying in those planes; also in the neighborhood of the blood-vessels and about the nests invading the muscular tissue. None was discovered in the mucous membrane proper or in the part of the cancer contiguous to it. The cells were large and usually contained a single nucleus, staining darkly; the protoplasm was completely filled with granules looking like micrococci, and taking with thionin a dark reddish-purple stain. The cells were generally oval or spindle-shaped; in some instances one or two processes crowded with granules projected from them.

Chorioepithelioma, or Deciduoma Malignum.—H. L. Williams⁴ discusses the origin of deciduoma malignum, and concludes that the tumor arises from the syncytium—that is, the epithelial covering of the chorionic villi, and not from decidual cells. The chief histologic features of the tumor are: 1. A fibrous reticulum resembling organized blood, in the meshes of which are large spaces containing blood and fibrin, but no glands, blood-vessels, or lymphatics. 2. Bars, bands, and islands of syncytial and Langhans's cells between the blood-spaces and in masses throughout the growth. 3. Vacuoles in the syncytial protoplasm, and in some cases distinct chorionic villi. 4. A small round-cell infiltration in the fibrin and reticulum, and also in the homogeneous protoplasm, is also conspicuously present.

Neuroglioma of the Brain.—H. M. Thomas and Alice Hamilton⁵ report a case. We omit the clinical history. The pathologic study of the tumor by Alice Hamilton revealed it to be a neuroglioma. It consisted of a great variety of cells that were divisible into two types: one had an invisible cell-

¹ Proc. Path. Soc. of Phila., N. S., vol. i., No. 6.

² Ibid., No. 3.

³ Ibid., No. 2.

⁴ Ibid., No. 4.

⁵ Jour. Exper. Med., Nov., 1897.

PLATE 6.

Fig. 1.

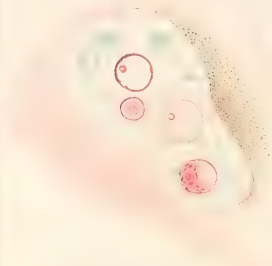


Fig. 2.



Fig. 3.

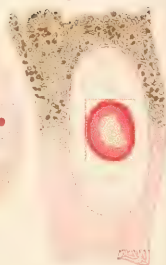


Fig. 4.



Fig. 5.

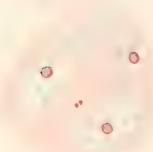


Fig. 6.

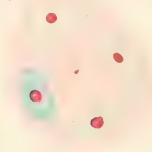


Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.

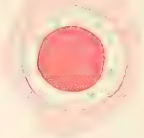


Fig. 12.

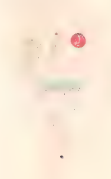


Fig. 13.



Fig. 14.

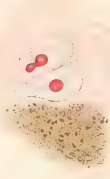


Fig. 15.



DESCRIPTION OF PLATES 6, 7.

FIG. 1.—Large cell with a single nucleus; nucleoli undergoing degeneration.

FIG. 2.—Multinuclear giant-cell, characterized by small nuclei produced by amitosis.

FIG. 3.—Cell with large nucleus and large degenerating nucleolus.

FIGS. 4, 5, 6.—Types of multinuclear cells of normal size, formed by multiple karyokinetic division.

FIG. 7.—Pigmented cell with resting nucleus. The attraction-sphere with centrosome lies in the cytoplasm near the nucleus.

FIGS. 8, 9, 10.—Various forms of retrogressive metamorphosis of the nucleolus.

FIG. 11.—Hypertrophied nucleolus.

FIG. 12.—Cell in karyokinetic division, with persistence of the nucleus during division.

FIG. 13.—Karyokinetic figure; the one centrosome is much larger than the other.

FIG. 14.—Cell with two nuclei, one of which is undergoing direct division.

FIG. 15.—Nail-shaped nucleus.

FIG. 16.—Division of the nucleolus.

FIG. 17.—Division of the nucleolus. The nucleolus is elongated, and its longest diameter lies in the direction of the equatorial plane of the nucleus.

FIG. 18.—Division of the nucleolus through elongation and constriction, with simultaneous division of the nucleus.

FIG. 19.—Premature division of the nucleolus.

FIG. 20.—Nucleolus greatly lengthened in the equatorial plane of the nucleus, and occupying the whole equatorial plane.

FIG. 21.—Division of nucleolus without indication of nuclear division.

FIGS. 22, 23.—Division of nucleolus with formation of nuclear plate.

FIG. 24.—Nucleus with many nucleoli.

FIG. 25.—Elongated nucleolus.

FIGS. 26, 27.—Stages of indirect nuclear division.

FIG. 28.—Multiple direct division.

FIGS. 29, 30, 31.—Fragmentation of nucleus.

PLATE 7.

Fig. 16.

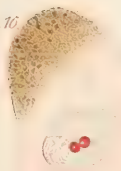


Fig. 17.



Fig. 18.

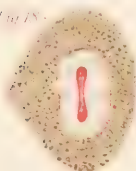


Fig. 19.



Fig. 20.



Fig. 21.



Fig. 22.



Fig. 23.



Fig. 24.



Fig. 25.



Fig. 26.



Fig. 27.



Fig. 28.



Fig. 29.



Fig. 30.



Fig. 31.



membrane and protoplasm which stained faintly, and processes which, if present, were exceedingly delicate; the other was distinguished by granular protoplasm, distinct outline, thicker processes, and usually a deeply stained nucleus. Spindle-cells were found in great numbers, and were furnished with simple long processes or with a brush of many fibers (Pinselzellen); certain large cells with multiple nuclei, somewhat resembling the cells of some sarcomata, were also seen. Among the spindle-cells were some which had granular protoplasm like the ganglion-cells, and thick and coarse processes; the blood-vessels were not especially numerous. Medullated and nonmedullated nerve-fibers were found in all parts of the tumor. Karyokinetic figures were found in some of the glia-cells. The irregular ganglion-cells composing a large part of the tumor, in the author's opinion, were not derived from the preexisting ganglion-cells, but represented the latest stages of the development of the tumor-cells. The author takes the view that all new growths in the brain, being epiblastic in origin, are to be regarded as gliomata, unless they are proved to have their starting-point in the membranes or in the walls of the blood-vessels.

Hypernephroma of the Kidney.—A. O. J. Kelly¹ makes an important contribution to this mooted subject. After a preliminary review of the literature, which he commands fully, he describes, first, a so-called struma of the adrenal, which was a cherry-sized tumor, resembling suprarenal cortex, and contained numerous hemorrhages; secondly, a malignant tumor of the suprarenal gland, a large growth, showing in part cell-columns with traces of a lumen and multiple necrotic areas. The tumor-cells rested directly upon the blood-vessels. The growth had spread to neighboring parts and had given metastasis along the blood-vessels. The first tumor represents a type of generally benign growths, springing usually from the cortex of the gland; they are in the majority of instances directly continuous with the gland-tissue proper. The third tumor is a hypernephroma [A hypernephroma, we may interpolate here, is a name given to tumors derived from suprarenal tissue, either of the gland itself or misplaced in the kidney or elsewhere. It is a term that takes account only of the histogenesis, and is noncommittal with respect to morphologic classification] that was found, together with small cysts, in an arteriosclerotic kidney. The cells showed fatty infiltration and were directly placed on the capillaries. The fourth, fifth, and sixth tumors are also hypernephromata, all three being malignant. The last two tumors described are a papillary and a tubular adenoma of the kidney. In the neighborhood of the former a small lipomatous hypernephroma was found. An interesting case of bilateral conrescence of adrenal and kidney is also discussed; and, finally, an apparently primary tumor of the kidney containing colloid, which latter feature led to the suspicion of a thyroid origin, and, indeed, in a piece of the thyroid gland accidentally conserved evidences of adenocarcinoma were found. In his criticism of the various theories advanced in explication of the origin of hypernephromata, which constituted 4 of the 7 renal tumors observed among 3098 autopsies, the author ranges himself on the side of Grawitz and Lubarsch. In answer to the contention of Hildebrand, that the cells never showed the serial arrangement found in the suprarenal, he very properly urges the necessity of comparing the tumors, not with the normal suprarenal gland, but with tumors developed from it. The rather striking similarity between certain tumors (endotheliomata) of bone and the so-called hypernephromata, which has by some writers been looked upon as confirming the endotheliomatous nature of the hypernephroma, is interpreted by the author as perhaps due to the bone-tumors being in reality secondary to overlooked hypernephromata, which

¹ Ziegler's Beiträge, Band xxiii., Heft 2, S. 280, 1898.

are often very small. Furthermore, benign suprarenal tumors do not give metastasis. A case is then cited of an endothelioma of the ilium with metastatic deposits in the kidney, which latter had at first been considered the primary growth, a hypernephroma; but microscopic examination showed the renal tumor to differ clearly from hypernephroid growths. In conclusion, the author considers the possible reasons of the preponderance of tumors of suprarenal rather than renal origin in the kidney.

Blastomycetes as Infective Agents in Malignant Tumors.—

Mafucci and Sirleo¹ are much less enthusiastic than other pathologists of the Italian school with regard to the part played by blastomycetes in the production of malignant tumors. They were never able to obtain cultures from carcinomata or sarcomata that had been removed from the living and were not ulcerated. Their conclusions are as follows: (1) *A priori* they consider malignant tumors infectious in origin. (2) The infective agent is not sufficiently determined, either through biologic or experimental proofs. (3) The search after the infectious agent of tumors should not be limited to one class of parasites. (4) There are among the blastomycetes some with pathogenic properties. (5) The processes produced by them do not resemble new growths of the nature of carcinoma or sarcoma. (6) They produce septicemia, supuration, and chronic inflammatory processes of the nature of granulomata. (7) The blastomycetes so far found in human carcinomata have, in animals predisposed to cancer, produced only ordinary inflammatory processes. (They do not consider that Sanfelice's experiments on dogs prove the power of blastomycetes to produce epithelial new growths.) (8) The blastomycetes of carcinoma and sarcoma in man cannot always be demonstrated histologically or by culture. (9) The blastomycetes are found especially in ulcerating malignant tumors in man. (10) The distribution of the blastomycetes in tumors leads to the inference that an infection has been superadded. (11) They do not exclude the possibility that blastomycetes may cause carcinoma and sarcoma; but do not believe that any experimental proof exists. (12) They do not deny that protozoa (psorozoa) can produce new growths; this is proved by the papilloma caused by the coccidium; but there is no experimental proof that they can cause carcinoma and sarcoma in animals susceptible to these diseases.

A Case of Epithelial Tumor due to the Bilharzia Hæmatobia.

—Albarran and Bernard,² on examining the urinary organs of a man who died in Egypt of bilharziosis, found the submucosa of the bladder much thickened and the epithelium proliferated. To the naked eye the mucous membrane presented numerous mammillary projections, which formed a distinct tumor at the fundus. Microscopically this area showed a particularly well-marked epithelial proliferation, resembling closely epithelioma of the bladder. In the connective tissue of the growth there were numerous eggs of the bilharzia. It would seem, therefore, that the presence of the ova was the exciting cause of the development of the tumor. The authors consider this to be a link in the chain of evidence of the parasitism of carcinoma. [This case can scarcely be used to strengthen the theory of the parasitic nature of carcinoma.]

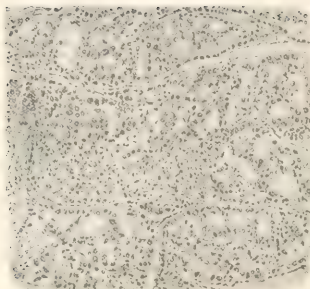
A Tumor Caused by Caterpillar-hairs.—Spitzer³ reports the case of a man, 62 years old, who had a hemispheric tumor of 3 months' growth on the anterior part of the dorsum of the left foot. It was sharply defined and covered with bluish skin, through which light-yellow nodules, the size of a barleycorn, could be seen. On removal of the tumor it was found to consist of a number of tubercle-like nodules embedded in a fibrous stroma, which

¹ Zeit. f. Hyg. u. Infectiouskr., Band xxvii., No. 1, 1898.

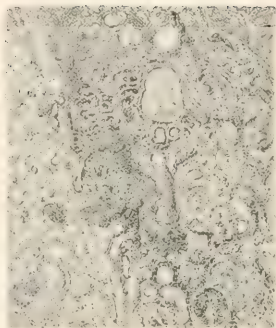
² Arch. de Méd. expér. et d'Anat. path., Nov., 1897. ³ Wien. klin. Woch., No. 26, 1897.

PLATE 8.

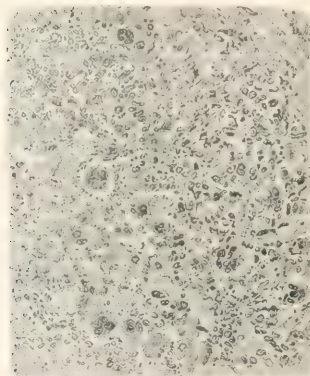
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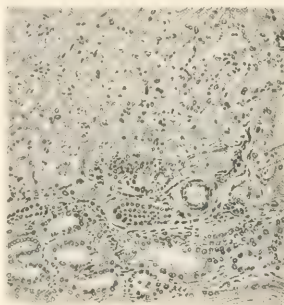
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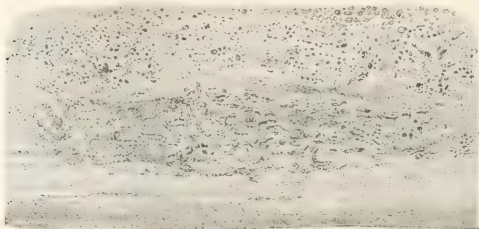
5.



3.



4.



DESCRIPTION OF PLATES 8, 9.

FIG. 1.—Section from the hypernephroma of adrenal of Case II.; $\times 120$.

FIG. 2.—Section through a place in Case III. where the adrenal cells are irregularly embedded in the renal cortex, where cysts are present, and where a dividing band of connective tissue is visible; $\times 50$.

FIG. 3.—Section from the hypernephroma of Case IV.

FIG. 4.—Section from the hypernephroma of Case V. An elongated portion of adrenal tissue, with adjacent tumor-particles separated from the kidney by a fibrous capsule, is visible; $\times 50$.

FIG. 5.—Section from another nodule of the same tumor; $\times 120$.

FIG. 6.—Section from the hypernephroma of Case VI.; $\times 120$.

FIG. 7.—Section from the pulmonary metastases of the hypernephroma of Case VII.: $\times 300$.

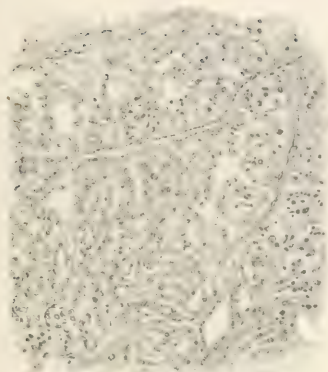
FIG. 8.—Section from the papillary adenoma of the kidney of Case VIII.; $\times 50$.

FIG. 9.—Section from the tubular adenoma of the kidney of Case IX.; $\times 50$.

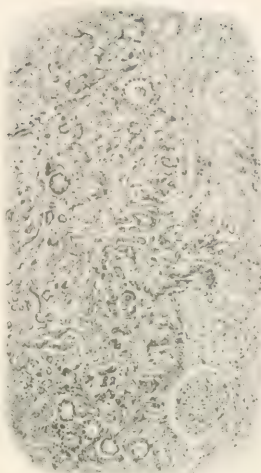
(Beiträge z. path. Anat. u. z. allg. Path., Bd. xxiii.)

PLATE 9.

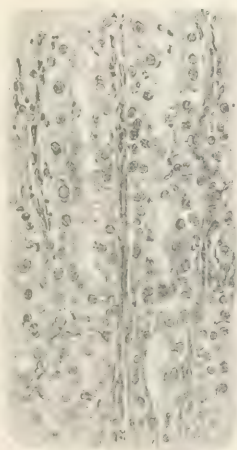
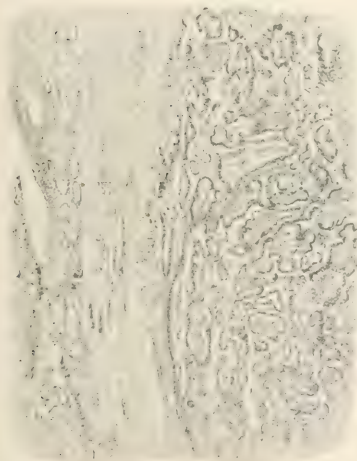
6.



9.



8.



were composed of epithelioid and small round cells, with occasional giant-cells. In the center of each was an accumulation of leukocytes showing no signs of caseation, and embedded in the leukocytic mass were some sharp cylindric hairs. Inquiry elicited the fact that 6 months previously the patient, while working in the field, had been suddenly seized with pains in the left foot. On taking off his boot he found a large hairy caterpillar. The foot became red and swollen; but this soon passed off, and the tumor did not make its appearance until 3 months later. The hairs of the larva in question (*Bombyx rubi*) are very thin and composed of chitin, and have barbed ends. They contain a small amount of formic acid.

BACTERIOLOGY.

TYPHOID FEVER.

The Influence of Environment upon the Biologic Processes of the Members of the Colon-group of Bacilli.—Adelaide Ward Peckham¹ has investigated the effect of modifications of the environment on the proteolytic function of the bacteria of the colon-group. As a test of the proteolytic function she used indol-production. It was found that in a medium characterized by large amounts of freshly formed peptone and the entire absence of fermentable material this function was greatly increased in activity. If, however, the cultivation was carried beyond the period of maximum indol-formation and each generation was restricted to this specific activity by being transplanted to fresh media of the same character, as soon as the growth reached its maturity (3 days) a modification of the vital activities of the organism occurred. Indol-formation was gradually abolished, even though it might have been excessive at an early period, and the culture died prematurely. A comparison of normal cultures with those in which there had been what seemed an exhaustive discharge of one function, showed that the latter cultures underwent a modification in their products of metabolism that coincided with a gradual loss of vitality, and that they finally died prematurely. The results of excessive stimulation of the fermentation-function were then studied, with the conclusion that such stimulation leads to exhaustion of energy in the production of enough acid to inhibit the growth, and finally causes the death of the organism. The proteolytic function resulting in indol as an end-product of metabolism is entirely abolished and the peptones are probably untouched, thereby causing a deficit in the amount of plastic material necessary to the building up of the bacterial cells. Another series of experiments showed that indol-production and pathogenesis could both be increased by growth of a culture in a medium which contained an unusual amount of proteid material so prepared as to be especially suitable for bacterial assimilation. There was, however, no parallelism between indol-production and virulence. Typhoid cultures were tested for indol, and a reaction was obtained in every culture, the greatest number of cultures being brought to indol-production at the termination of the third period of cultivation. The author finally concludes that, assuming the typical colon-bacillus and the typical typhoid bacillus to represent types of one group, there is a series of closely related forms that may be regarded as intermediate or transitional. She is inclined to regard the typical colon-bacillus as the type of this group, for the reason that its functional equilibrium, as observed in the intestine, is so strong a quality that it may be readily perpetuated. When the members of the colon-group are cultivated under circumstances favorable for

¹ Jour. Exper. Med., Sept., 1897.

both fermentation and proteolysis fermentation invariably takes precedence, and no evidence of proteolysis is manifested until after fermentation has ceased. The cultivation of all the members of the group under circumstances that favor the development of one function at the expense of another results, first, in an apparent increase of vigor, which is temporary, and is quickly followed by decline and death of the cell. By the method of experimentation through which proteolytic activity of the typical colon-bacillus was accentuated, the author was able to develop the function of indol-formation not only in atypical colon-bacilli that had been devoid of it, but in every specimen of typical typhoid bacilli as well, whence she regards indol-formation of questionable value as a differential test between typhoid and colon-bacilli. The colon-bacillus at times possesses pathogenic properties, and by artificial methods of treatment can often be brought from a condition of benignity to one of virulence. The value of the serum-test for the differentiation of typhoid and colon-bacilli would seem to be questionable.

Biologic Differences between the Bacillus of Typhoid Fever and the Bacillus Coli.—L. Toinot and Brouardel¹ state that there are marked differential characteristics shown by cultures of these two micro-organisms in peptonized bouillon containing arsenous acid. The bacillus of Eberth exhibits no growth in bouillons containing more than 1 cgm. of arsenous acid to the liter. It is equally impossible to train this organism, even if the observer begins with bouillons very much more feebly arsenical, and proceeds by degrees to the more strongly arsenical, to grow in a bouillon which is of a higher arsenical strength than 1 cgm. to the liter. The bacillus coli, on the other hand, from the very first, from whatever source it may be derived, grows well on bouillon containing 1.5 g. of arsenous acid per liter. Certain samples will even grow from the very first in bouillons containing 1.75 or even 2 g. of arsenous acid to the liter; and this appears to show that this bacillus exists as various species, as opposed to the single species of the bacillus of Eberth. The bacillus coli is remarkable for the ease with which it can be trained to grow in an arsenous environment. It is possible, by beginning with a bouillon of the arsenical strength of 1.5 g. to the liter, gradually to induce it to grow in a medium containing arsenic in the strength of 3 g. to the liter. Between an organism of this kind, which is so resistant to an enormous dose of arsenic, and the bacillus of Eberth, which is incapable of developing in the presence of the very small proportion of 1 cgm. to the liter, there is undoubtedly a remarkable biologic difference, which may be added to those already noticed, such as the indol-reaction and the lactose fermentation-test, and which stands on the same footing. The same biologic difference in the presence of arsenous acid offers a method of differentiation from the group of the paracolon-bacilli. [These observations are most interesting biologically and practically; it should not be difficult, if they prove correct, to separate the typhoid from the colon-bacillus by culture.]

A Method of Isolating and Identifying Bacillus Typhosus, Based on a Study of the Bacillus Typhosus and Members of the Colon-group in Semisolid Culture-media.—P. H. Hiss, Jr.,² recommends a medium containing 5 g. of agar, 80 g. of gelatin, 5 g. of meat-extract, 5 g. of NaCl, and 10 g. of glucose to the liter, for isolating the typhoid bacillus. In this medium the typhoid bacillus gives on culture a characteristic clouding not found in cultures of other organisms. The medium described is titrated to determine its reaction, phenolphthalein being used as an indicator. HCl or NaOH is added to bring it up to the required reaction indicating 1.5% of nor-

¹ Phila. Med. Jour., Apr. 16, 1898.

² Jour. Exper. Med., Nov. 8, 1897.

mal acid. The medium for plates contains 10 g. of agar, 25 g. of gelatin, 5 g. of beef-extract, 5 g. of NaCl, and 10 g. of glucose.

The Growth of the Typhoid Bacillus in the Soil.—Having observed a number of outbreaks of typhoid fever in what appeared to be a typhoid area, John Robinson¹ concluded that the source of infection was in the soil; but a bacteriologic examination of 30 samples of soil was negative. He then inoculated soil with typhoid germs, and from time to time took samples for investigation. He found that the typhoid bacilli were able to grow in certain soils, and that they could, under certain conditions, survive from one summer to another; the rains of spring and autumn and the frosts and snow of winter did not kill them. The part of the soil exposed directly to the sun showed no typhoid bacilli; but by scraping down $\frac{1}{16}$ in. from the surface the organisms were found to be present. Cultures of the bacilli planted at a depth of 18 in. grew to the surface, and others inoculated on the surface extended to a depth of 3 in. It is possible that this downward growth may have been assisted by mechanical means, as rain and artificial watering. No lateral spread could be ascertained. Vegetation was detrimental to the healthy growth of the organisms.

Experimental Typhoid Fever by Alimentary Inoculation.—Paul Remlinger² fed rats and rabbits on vegetables that had been artificially contaminated with Eberth's bacillus, and found that it was possible to communicate to the rat and to the rabbit, by the food, an affection which, from the bacteriologic and anatomic point of view, presented the greatest analogies with human typhoid fever.

The Nature of the Lesions in Typhoid Fever.—F. B. Mallory³ has arrived at the following conclusions as the result of a histologic study of 19 cases of typhoid fever. Histologically, he says, the essential lesions of typhoid fever are proliferative, and stand in close relationship to those of tuberculosis; but the typhoid bacillus bears no such relation to the lesions of typhoid fever as the tubercle-bacillus does to the lesions of tuberculosis. In typhoid fever the lesions are essentially diffuse; in tuberculosis they are focal. Experimental work with the typhoid bacillus he regards as out of the question, owing to the insusceptibility of animals. Judging from the gross and histologic lesions alone, he considers that we have to do in typhoid fever with a mild toxic agent which in part is absorbed from the intestinal tract, and in part is produced in the body, in the various organs, and in the blood. The intestinal lesions depend upon absorption, mainly through the lymphatic apparatus, but in part through the capillaries. The toxin is diffusible, as is shown by the extension of the lesions in the submucous, serous, and muscular coats to a varying distance outside of the path of absorption. The lesions in the mesenteric lymph-nodes depend on absorption through the lymphatics; while those in the rest of the body depend primarily on the toxin in the general circulation. In the liver they are partly primary, as is shown by the proliferation in the capillary endothelium, partly secondary and dependent on cell-embolism; while those in the spleen and bone-marrow depend, chiefly at least, on the toxin in the circulation. How much of the toxin is produced within the organs themselves he regards as impossible to say; but the abundant supply and the slowness of the circulation in those organs probably have some effect in the production of lesions. Finally, he concludes that we may have more or less abundant formation of phagocytic cells generally throughout the lymphatics of the body, as shown by the presence of phagocytic cells in the

¹ Brit. Med. Jour., Jan. 8, 1898.

² Ann. de l'Inst. Pasteur, Nov., 1897.

³ Jour. Boston Soc. Med. Sci., Apr., 1898; Univ. Med. Mag., Sept., 1898.

lymph-vessels of the heart, lungs, testicles, pia-arachnoid, and by the focal lesion to which they may give rise. Here the lesions are evidently due to the elimination of the toxin from the blood-vessels and its reabsorption through the lymphatics. To this same class belong the lesions in the lymphatics around the portal vessels of the liver. The cell-changes and the lesions above described are not, he believes, peculiar to typhoid fever, except in location, sequence, and degree. [The interesting facts emphasized by Mallory, particularly the widespread lymphatic changes, permit us to speculate to some extent on the causation of the symptoms of typhoid fever. It is warrantable to assume that the rapid formation of new cells is attended by an elaboration of metabolic products which are thrown into the blood and affect the system, which is not prepared for them. These cell-products, whether they be identical with those of normal cells of the same type or not, add their influence to that of the bacteria, and that influence must be reckoned with in any effort to explain the complexity of symptoms and remote changes in typhoid fever. One of the editors has applied the term metabolic toxemia to the hypothetic state produced by an overactive cell-proliferation.]

On the Presence of the Typhoid Bacillus in the Urine.—M. W. Richardson¹ found typhoid bacilli in the urine of 9 out of 38 patients; 172 specimens were examined, with 44 positive results. The bacilli, when demonstrated, were always present in large numbers and in practically pure culture. They appeared first in the later stages of the disease, and persisted in the majority of the cases far into convalescence. Their presence was nearly always associated with albuminuria and casts. On the other hand, urines containing considerable amounts of albumin often showed no typhoid bacilli. [The importance of disinfecting the urine of typhoid patients becomes more and more evident through the accumulation of such observations as the foregoing.]

Secondary Infection with Tubercle-bacilli.—D. Hansemann² has studied tissue-changes of the character brought about by the tubercle-bacillus, to learn how often they may be due to other causes and become secondarily infected by this organism. In a case in which the mesenteric glands presented swelling tubercle-bacilli were found in some of the glands and were absent from others. In another case typhoid ulcers of the intestines showed gray tubercles, evidently more recent than the ulcers, and limited to the ulcerated Peyer's patches. In a case of pneumonia diplococci were at first present in the sputum, and later tubercle-bacilli were found. On postmortem examination fresh tubercles were discovered in the midst of the older, unresolved pneumonia. Finally, in a case of bronchopneumonia a tuberculous cavity was found; but the tubercle-bacilli and the histologic appearances of tuberculosis were limited to the immediate neighborhood of the cavity, and the original condition was a simple pneumonia. Fibrous thickenings of the bronchi and lung-tissue are often primary, and become subsequently affected by tuberculosis. Hansemann believes that fibrous thickening about the lymphatic channels of the lungs is commoner than is usually admitted, and may remain free from tuberculous involvement or become the seat of tuberculosis, though even when nontuberculous it often presents the clinical picture of tuberculosis. In a case in which tuberculosis had been diagnosticated from the presence of bacilli in the sputum a bronchiectatic cavity was found, postmortem, in each upper lobe; one of these was free from bacilli, while the other contained clumps of them; the bacilli had, however, not invaded the walls of the cavity, but were simply using its contents as a culture-medium. Of 22 cases of syphilis of the lungs examined, only 5 did not exhibit secondary tuberculosis.

¹ Jour. Exper. Med., May, 1898.

² Berlin. klin. Woch., Mar. 14, 1898.

THE DIPHTHERIA-BACILLUS.

The Significance of Different Forms of the Klebs-Löffler Bacillus.—W. J. Class,¹ from some studies on the Klebs-Löffler bacillus, concludes: 1. That the short Klebs-Löffler bacillus apparently produces a toxin of greater virulence than the long forms, although the local manifestations may not be so extensive. 2. That the long Klebs-Löffler bacillus and the streptococci, when found alone, give rise to a mild form of the disease. 3. That the streptococcus is found associated with the Klebs-Löffler bacillus in most of the severe cases. It is possible that by causing a more intense inflammatory reaction it opens avenues by which the toxins of the Klebs-Löffler bacillus may find more ready entrance into the circulation. 4. That the apparent beneficial action of the antitoxin of the Klebs-Löffler bacillus in cases in which the bacillus is not present is due to the fact that, though the local action of the microbes varies to a considerable extent, the action of their toxins, as is shown by the similarity of the constitutional symptoms produced by them, present many kindred features. The thought therefore arises that the antitoxin of one affection may have an inhibitory effect on the toxin of another, as is shown by the fact that whooping-cough and some other infectious diseases have been shown to occur less frequently in vaccinated persons, and some cases have apparently been cured by vaccination.

THE GONOCOCCUS.

The Gonococcus and its Toxin.—J. de Christmas² has found that rabbit-serum is an excellent medium for the growth of the gonococcus. Albuminous fluids from man are also good culture-media when mixed with peptonized gelatin, in the proportion of 1 of the former to 2 of the latter. The organisms live on the majority of these media for only 3 or 4 days; it is therefore necessary to reinoculate them every 48 hours. Rabbit-serum is an exception, however, as on that medium the organisms live for 3 or 4 weeks or longer. In order to obtain large quantities of culture, ascitic fluid mixed with peptonized bouillon, in the proportion of 1 part of the former to 3 of the latter, is most useful. Glucose, in very small proportion, 1:1000, augments the value of the medium.

Pure cultures are obtainable from gonorrheal pus in the following manner: A small drop of pus is spread upon the surface of the coagulated rabbit-serum, which is then placed in the incubator at 36° C. If the gonorrhea is recent, and if the pus contains many gonococci, 12 hours' incubation will produce many small, transparent colonies. The gonococcus develops more quickly than the other microorganisms often present in the pus of gonorrhea, and it is easy to inoculate an isolated colony into a second tube. Inoculated into the urethra the growth produces a purulent discharge resembling true gonorrhea. The uniform failure to inoculate the gonococcus in the lower animals may be accounted for by the higher temperature of the animals experimented upon. When the organisms are injected into the venous system of the rabbit they do not die immediately, but may be cultivated from the blood for 24 or 48 hours.

The gonococcus produces a toxin which gives rise to toxic phenomena, and even death. At the point of inoculation a slight edema or a large abscess may be produced, depending upon the amount of toxin injected. The constitutional manifestations consist of fever and loss of weight. The fever disap-

¹ Jour. Am. Med. Assoc., Apr. 30, 1898.

² Ann. de l'Inst. Pasteur. Aug., 1897.

pears at the end of from 48 to 72 hours, the temperature becoming subnormal. There is no apparent lesion of the organs, the principal phenomena being a profound anemia.

The loss of weight may be partially due to a profuse diarrhea, which is always observed. The toxin is partly intracellular and partly extracellular; it is precipitated by strong alcohol, and a stable solution of it can be made by the use of glycerin. The glycerin-solution of the toxin is rapidly fatal to rabbits. If injected into the anterior chamber of the eye gonotoxin shows remarkable pyogenic properties. The same properties are observed when the toxin is injected into the serous cavities. When injected into the urethra of the lower animals or into the conjunctival sac gonotoxin produces no true inflammation; but when applied to the human urethra a purulent secretion is rapidly established. The urethra is not immunized by repeated injections of gonotoxin. The serum of goats immunized to gonotoxin shows a well-marked antitoxic action when injected into rabbits at the same time that the toxin is injected. The antitoxic power of the serum has not been tried on man.

Pathogenicity and Toxicity of the Gonococcus.—Lyder Nicolsen¹ has made a series of experiments on animals with the gonococcus, from which he concludes as follows: 1. Injection of gonococcus-cultures into the knee-joints of rabbits produces a purulent arthritis. 2. Gonococci introduced into the peritoneal cavity cause death without producing a local affection. 3. The effect is the same whether live or dead cultures are used. 4. The pathogenic action does not depend on an increase of the cocci introduced, but on the toxic substances contained in the bacterial bodies; the bacteria do not produce a soluble toxin in cultures. 5. The poisons in the bacterial body are not destroyed by drying or by heating to 120° C.; they cannot be extracted by caustic soda or distilled water.

Gonococcus-culture and Gonococcus-toxin.—A. Wassermann² makes a further contribution to this subject. Using the simple medium devised by himself (nutrose-hog-serum bouillon or agar), he has succeeded in cultivating the gonococcus with ease, and has directed his attention to a study of the toxic effects of the microorganism. The gonococcus is pathogenic for mice, guinea-pigs, and rabbits; but does not cause infection, only an intoxication. Whatever multiplication takes place is due to the growth of the microorganism in the medium injected with it; in the body as such it does not multiply. Yet the animals die, and it is only in the acute cases that gonococci are found in the peritoneal cavity at death. These facts point to the action of a toxin, the existence of which is further proved by the fact that a liquid culture of gonococci sterilized by heat produces the same phenomena as a living culture. The poison—*gonotoxin*—is contained in the bodies of the bacteria, not in the culture-medium, except in old cultures, in which the small quantity of toxin present can be explained by the decomposition or solution in the medium of dead bacteria. The toxicity of the gonococcus is very variable; the toxin is highly resistant, however, and is not destroyed by precipitation with absolute alcohol nor by prolonged heating to 100° C. Injected subcutaneously into human beings the toxin produces a painful induration, with a slight rise of temperature, malaise, and joint-pains, all symptoms disappearing in 2 days. Immunity could not be produced either in man or animals. When the toxin is injected into the eye of a rabbit it produces opacity of the cornea, hypopyon, and at times total loss of the eye. In the concluding section the author endeavors to explain some of the clinical problems, especially the infectiousness of chronic gonorrhea,

¹ Centraltbl. f. Bakt., Parasit. u. Infektionskr., Sept. 30, 1897.

² Zeit. f. Hyg. u. Infektionskr., Band xxvii., Heft 2, Apr., 1898.

from the exudate of which gonococci may be absent. After a period of active growth the organism ceases to thrive, both on mucous membranes and in artificial cultures. This cessation is not due to exhaustion of the culture-medium, as another gonococcus-culture inoculated or transplanted will grow actively. The cause is not known, but as far as the mucous membranes are concerned, in the crypts and recesses of which a few gonococci persist for a long time, if some irritation or trauma occurs the germs will again appear on it in great numbers. After their death toxin is liberated. This may occur in a joint-cavity or in a cavity—as in cases of ascending gonorrhea in women—walled off by inflammation, and may give rise to repeated exacerbations of the inflammation. Depending upon the exact period of examination in such cases, few or many gonococci will be found.

YELLOW FEVER.

Immunity and Serotherapy against Yellow Fever.—J. Sanarelli¹ found that the serum obtained from the blood in the heart of yellow-fever victims produced marked agglutination in pure cultures of bacillus icteroides contained in a test-tube. The intensity of this reaction, however, was variable. Inoculated into animals, it did not exert any preventive power against the specific bacillus. The serum from the cavity of the pericardium had a feeble agglutinating power; at times this power was wanting. Serum obtained from a patient who was convalescent from yellow fever presented slight agglutinating power, but in animals had very little protective action against the bacillus icteroides. The simultaneous injection of serum and virus did not prevent death in guinea-pigs; but if the serum was injected 24 hours before the virus the majority of animals survived. The bacillus icteroides did not multiply in this serum, but remained living for a long time. Serum from normal individuals or from patients convalescent from other diseases than yellow fever never showed the slightest effect, either preventive or curative, when injected into animals. Antidiphtheric serum and antityphic serum produce rapid agglutination of the bacillus icteroides; but anticolic serum does not. For immunizing purposes guinea-pigs are the animals of choice; but the vaccination requires about 6 or 7 months for its completion. Although the animal resists the virus, it is still susceptible to the toxin at the end of this period. The dog is more quickly immunized against the bacillus icteroides than is the guinea-pig. In 2 months a dog may be rendered immune to large doses of the virus if he is injected first subcutaneously and subsequently intravenously. It is necessary to produce purulent collections before passing to intravenous injections. The ox has the advantage over the horse in tolerating large doses of the bacillus by subcutaneous injection without presenting abscesses; but it cannot stand large doses of the toxin or of the sterilized virus intravenously. Generally the intravenous injections are badly tolerated, even by the horse, and require certain precautions. The process of immunizing a horse is described.

The Bacillus Icteroides of Sanarelli.—Surgeon-General Sternberg² endeavors to show that the bacillus *x*, discovered by him in 1889, at Havana, is identical with Sanarelli's bacillus; both are nonliquefying and both grow readily in ordinary nutrient media. [In their biologic characters they are certainly similar, but are probably not identical.]

The Bacillus *x* and the Bacillus Icteroides.—J. Sanarelli³ replies

¹ Ann. de l'Inst. Pasteur, Oct., 1897.

² Am. Jour. Med. Sci., Sept., 1897.

³ Centralbl. f. Bakt., Parasit. u. Infectiönskr., Dec. 22, 1897.

to Sternberg's article, and states that a careful study of the former's report proves to him that among the numerous bacteria described by Sternberg there is none that, either from the point of morphology or pathogenicity, can be considered even remotely analogous to his bacillus *icteroides*.

Satellitism of Colonies of Pfeiffer's Bacillus in Mixed Cultures.—Meunier¹ found that when Pfeiffer's bacillus is inoculated on a proper medium (blood-agar), on which *Staphylococcus aureus* is then planted, the growth of the influenza-bacillus is greatly favored, and colonies 10 or 20 times the usual size are developed. Diverse common bacteria have the same influence as the staphylococcus, but in a less degree. The mechanism of this symbiosis, this *cultural satellitism*, is obscure; but the observations of the author and of Grassberger show that the fertilization is not due to a product directly secreted by the adscititious germ, but to a modification of the hemoglobin of the medium. The observation is also of practical value in view of the difficulties attending cultivation of the influenza-bacillus. The author recommends the following method: An aqueous solution of defibrinated blood from the rabbit or, better, the cat, is prepared, and is used to impregnate the surface of agar. On this medium Pfeiffer's bacillus is inoculated, and then after the tubes have been allowed to dry in the vertical position for a few hours, *Staphylococcus aureus* is implanted at 2 or 3 points. Twenty-four hours in the incubator suffice to give beautiful satellite cultures of Pfeiffer's bacillus.

The Bacillus of Chancroid.—Krefting,² in 143 cases of soft chancre, found 27 with buboes; of the latter, 7 were virulent, and all of these contained Ducrey's bacillus. The other 20 were absolutely sterile.

Bacteriology of Whooping-cough.—Czaplewski and Hensel³ describe a short bacillus with distinctly staining rounded ends, commonly occurring in pairs, sometimes in chains, and often so small as to resemble a coccus. It is found in sputum, both free and in pus-cells, increasing as the disease advances. In uncomplicated cases it could be obtained in pure cultures; in others it was associated with the streptococcus and the pneumococcus. It grows on any ordinary medium except potato, appearing on agar as small, dew-like, pointed colonies. It resembles Koplik's bacillus, but is nonmotile. C. Spengler⁴ states that he found a similar bacillus in the sputum in whooping-cough, but had postponed publication of his observations until he could verify them in a subsequent epidemic. H. Koplik⁵ compares the bacillus discovered by Czaplewski and Hensel with that described by himself. The latter is facultative anaerobic, does not stain by Gram's method except in pure culture, and the staining is more pronounced at the ends. The organism is not found in the sputum during the prodromal stages. For purposes of culture the sputum is placed in sterilized Petri dishes, and the grayish particles are fished out and inoculated on hydrocele-slants. At the end of 24 to 48 hours in the incubator a mixed bacterial growth appears. This is suspended in bouillon and spread over another tube. The bacilli appear as dull, grayish-white or pearly colonies. On agar the colonies are whitish or grayish by reflected, and straw-colored by transmitted, light.

The Cause of Rabies.—A. Grigorjew⁶ believes that rabies is due to protozoa. The parasites only multiply in the nervous tissues and cannot be

¹ Soc. de Biol., Séance, June 11, 1898; Sem. méd., June 15, 1898.

² Norsk. Mag. f. Lægevid., No. 12, 1897; Centralbl. f. innere Med., No. 22, 1898.

³ Centralbl. f. Bakt., Parasit. u. Infectiouskr., Dec. 22, 1897.

⁴ Deutsch. med. Woch., Dec. 23, 1897. ⁵ Bull. Johns Hopkins Hosp., Apr. 2, 1898.

⁶ Centralbl. f. Bakt., Parasit. u. Infectiouskr., Oct. 12, 1897.

cultivated. In the living organism the virulence of the parasites is not reduced by simultaneous inoculation of virulent microorganisms. The latter, on the other hand, are retarded in their development. In rabbits the course of laboratory-rabies can be shortened and altered if the virus is mixed with highly virulent microorganisms. It is occasionally possible to separate the virus from contaminating microorganisms by passage through the dog. Rabies can be produced just as well by inoculation into the anterior chamber of the eye as by subdural inoculation, and this has the advantages that it is simpler and that it is more easily possible to recognize contamination with other organisms. A brief description of the supposed protozoa is given—they were obtained from the anterior chambers of the eyes of rabbits inoculated with rabic virus—viz., a portion of the medulla oblongata of a rabid animal.

The Bacteriology of Acute Articular Rheumatism.—Achalme¹ found in some cases of acute articular rheumatism during life and after death an anaerobic bacillus which grows in most media, especially in the liquid ones. Inoculation into animals produced pericarditis, myocarditis, and sometimes endopericarditis and pleuritis. [The author's account is quite circumstantial, and it is possible that the long-sought-for cause of rheumatism has been found. Opportunities for testing his observations in this country are not lacking. Thiroloix also found an anaerobic bacillus in rheumatism, an observation which has been confirmed by Triboulet.²]

Bacteriology of Rickets.—Mircoli³ believes that rickets is due to infection with streptococci and staphylococci. These organisms are constantly found in the mouths of infants and the mammary ducts of nursing-women. As long as the alimentary canal is healthy nothing happens; but if it is out of order, or if in any way these organisms enter the blood and are localized in the organs, especially in the parts of greatest functional activity, the disease is produced. In infants these are the nervous system and the epiphysial ends of the bones. The lesions in the latter he considers a chronic osteomyelitis of special type. Mircoli⁴ also studied the effects of inoculations of staphylococcus in young rabbits; the result was usually epiphysitis. When injections were made at the end of the first week of life and only small quantities of culture were employed, hypertrophy of the epiphyses, particularly the cartilaginous portion, and chronic hyperemia resulted.

Pathogenic Bacteria and Flies.—G. Marpmann⁵ has made some studies to determine: 1. Whether pathogenic bacteria are attenuated by passing through the bodies of flies. 2. Whether the bacteria, if altered, are capable of exercising an immunizing influence in a new infection. 3. Whether bacteria introduced into the blood through the sting of an insect serve for protective vaccination. 4. Whether in one way or another the infectious power of the bacteria can be attenuated by insects. For the first experiments the author used an organism, apparently the bacillus septicus, isolated from the soil, which was pathogenic for mice. Pieces of zwieback were moistened with a culture and placed under a fly-glass; flies that fed on this material could be kept alive for from 4 to 6 days. Three groups of mice, 270 each, were inoculated (a) with infected flies, (b) with peptone-water cultures of the organism, and (c) with fresh flies from the garden. 70% of the first group of animals died, while only 5% of those inoculated with garden-flies died. Fourteen flies inoculated into the last group contained pathogenic organisms, and cultures from

¹ Ann. de l'Inst. Pasteur, Nov., 1897.

² Sem. méd., Nov. 24, 1897.

³ Gaz. degli Ospedali e delle Clin., Jan. 30, 1898; Brit. Med. Jour., Apr. 23, 1898.

⁴ Deutsch. Arch. f. klin. Med., Band lx., Heft 1.

⁵ Centralbl. f. Bakt., Parasit. u. Infectiouskr., Aug. 21, 1897.

the dead mice yielded in all cases a proteus bacillus. Regarding the second question, it appears that flies are capable partly of digesting the bacteria and partly of attenuating their pathogenic properties. The third question cannot be readily answered by experimentation. The flea is practically the only stinging-insect that attacks mice. The reaction of human beings to insect-bites is variable; in some, marked swelling follows, in others, scarcely any change. The insects probably produce a toxic substance which causes the swelling; but probably in many instances the sting contains pathogenic bacteria, which may provoke a more marked reaction and even sepsis. The third and fourth questions still remain unanswered. In the meantime the author gives his own views, which it may be well to reproduce: 1. Flies and insects can transport infectious material and may infect our foods, in which multiplication of the pathogenic organisms can take place. 2. The pathogenic septic bacteria are attenuated in the insect-body. 3. Human beings react differently toward insect-bites. 4. It is probable that insects either possess a marked bactericidal power or that they in some way produce an immunity through the sting. He believes that there is an attenuation of the pathogenic germs, so that in districts rich in insects, flies, and gnats, epidemics are rarer and more benign than in other districts; furthermore, the epidemic diseases vary in their character and intensity, and it is probable that this variation is connected with the distribution of stinging-insects.

The Influence of the Röntgen Rays upon Bacteria.—H. Rieder¹ exposed fresh cultures of various pathogenic bacteria to the X-rays for from 40 minutes to 1 hour. In all cases colonies developed in only those portions that were protected against the rays. When developed colonies were exposed to the rays they were not destroyed, but no more colonies developed. The growth of the tubercle-bacillus was not prevented, but it was retarded. This limitation of growth was not due to the heat of the rays, nor was it due to any chemic action on the media, as bacteria afterward grew on areas that had been exposed to the rays. [These results are more favorable than those of Bonome and Gros;² as yet, the published observations are too few to render a final judgment on the bactericidal action of the X-rays possible.]

IMMUNITY.

The Valuation of Diphtheria-serum and its Theoretic Basis.—Ehrlich³ makes an important contribution to the theory of antitoxins, in which he also discusses the method of testing toxin and antitoxin. This part we omit, and give only his interesting speculation on the mode of action of antitoxin. Ehrlich, it will be remembered, believes, contrary to Buchner, that during the neutralization of the toxin by the antitoxin one molecule of the latter combines with a definite, unchangeable quantity of antitoxin, a process analogous to the formation of double salts. This has been proved for ricin. More recent investigations of Ehrlich have shown that toxin and antitoxin combine much more promptly in concentrated solution, and that heat hastens and cold retards the union. Ehrlich assumes that there are in an animal's body distinct cell-groups which possess a maximal specific affinity for a definite poison; as, for example, the nervous system for tetanus-poison. The functioning protoplasm which constitutes the cell consists, according to Ehrlich, of a

¹ Münch. med. Woch., Jan. 25, 1898.

² Giornale Med. del Regio Esercito, Ann. 4s., No. 6; Brit. Med. Jour., Aug. 14, 1897.

³ Abdruck a. d. klin. Jahrb., Band vi., Jena, 1897; Centrabl. f. Bakt., Parasit. u. Infektionskr., p. 357, 1897.

working-nucleus and certain lateral chains (Seitenketten) incorporated in it, which possess different functions. Such lateral chains have the property of fixing or "anchoring" the poisons, and this fixation may be, as in tetanus-poison, permanent. If the lateral chain has been fixed, as, for example, by tetanus-poison, its physiologic activity is abolished. The defect, according to definite natural laws, must be replaced by a new formation of the lateral chain of the same functional quality (Regeneration der Seitenkette). Further fixation by poison leads to the formation of new lateral chains—that is, antitoxins—so that finally there is an overproduction of such lateral-chain antitoxins. The antibodies are, according to this theory, the lateral chains of the cell-protoplasm formed in excessive quantities and then thrown off. Only such substances can exert a toxic action as are capable of combining with toxophorous bodies in vital organs, and the preexistence of such receptive or combinable lateral chains is the prerequisite for the occurrence of poisonous action.

In the same article Ehrlich refers to the fact that in the course of time toxins undergo certain changes, and terms the transformation-products *toxoids*. These toxoids, although no longer toxic, are capable of uniting with lateral chains. The toxoids are often present in considerable quantity, and are formed especially in old cultures; but they are present even in recent ones. In the vegetable toxalbumins analogous substances are found. The toxoids may present a variable relationship toward the antitoxin. 1. They may have a greater affinity than the toxin—*protoxoids*. 2. They may have the same affinity—*syntoxoids*. 3. They may have a less affinity—*epitoxoids*. Explicit rules are given for the testing of antitoxin.

A. Wassermann¹ found that bone-marrow from the ribs of various animals had no definite influence on the typhoid bacillus; while the bone-marrow, the spleen, and lymph-glands of animals that had been treated with injections of cultures of the typhoid bacillus had an evident protective influence against typhoid infection. Wassermann concludes that in the production of immunity against typhoid fever there are constant biologic reactions between the typhoid bacilli and some of the organs. The products of the bacilli unite with some of the elements of these organs, and the combined substances are thrown into the blood and unfold bactericidal activity.

Acquired Immunity.—Gottstein² believes that acquired immunity is not in a strict sense an immunity, but the individual escapes a second attack by the workings of the doctrine of chance, and points out that although the winning of the first prize in a lottery a second time is practically unheard of, no one would think to claim this as a case of immunity. Human acquired immunity should be investigated without reference to experiments on animals. With regard to acute fevers that are definitely held to confer immunity, he finds that only 3 are universally stated to do so—namely, small-pox, measles, and scarlet fever. As regards the first, 2 or even 3 attacks are not uncommon, and their rarity is in accordance with the law of probabilities. Three factors combine to produce the infrequency of recurrence. First, many diseases, such as diphtheria, are particularly associated with early life, and when a person is exposed again to the infection he has very often passed the age of special liability. Other diseases, such as cholera and typhus, occur in infrequent epidemics, so that an individual has but little chance of meeting them. Lastly, and this is most important, deadly diseases, such as cholera, diphtheria, and plague, spare only those who are most resistant and in whom the probability of recurrence is very slight. He also attacks the current views as to serum-immunity, referring to experiments which have shown that the

¹ Berlin. klin. Woch., Mar. 7, 1898.

² Ibid., Sept., 1897.

serum of new-born babies and of adults who have never suffered from diphtheria is capable of protecting guinea-pigs against diphtheria-toxin. Furthermore, according to Weismann's theory, acquired immunity cannot be transmitted, and hence will not explain family and racial insusceptibility to the disease. This is really a heightened power of resistance, arising from elimination of the weak in the struggle for existence. Finally he suggests that in many exanthemata the true cause of the immunity may be a hardening of the skin following a rash and preventing cutaneous reinfection. In illustration he cites the case of vanilla-workers, who after once recovering from the eczema induced by their trade, are no longer liable to it. [The results of animal experiments are too unequivocal to be disregarded; furthermore, the protection afforded by vaccination against small-pox is a conspicuous example of acquired immunity that has nothing to do with the theory of probabilities.]

The Influence of the Organism on the Toxins.—Metschnikoff¹ embodies his views in the following summary: 1. The inferior plants, like bacteria and fungi, are able to destroy toxins and to transform them into vaccines without producing antitoxins. 2. The invertebrates are not capable of producing tetanus-antitoxin in appreciable quantity. 3. The production of antitoxins begins in the animal series in the crocodile, in which this property is more developed than in the high animals, like the mammals. 4. The antitoxic power ought not to be considered as due to febrile reaction. 5. The antitoxic property in the fowl resides in the blood. 6. It is not possible that natural immunity depends upon the antitoxic power. 7. The antitoxic property in the animal kingdom has an evolution much less ancient than the phagocytic action.

Metschnikoff² has studied the influence of the central nervous system on tetanus-toxin, and confirms the results of Wassermann and Takaki. The brain-tissue of the guinea-pig protects against several times the fatal dose of tetanus-toxin; it protects the mouse as well as the guinea-pig; the brains and spinal cords of the tortoise and fowls have no antitoxic power against tetanus in the guinea-pig and mouse. The antitetanic power has nothing to do with immunity. The more susceptible an animal to tetanus the more efficacious its nerve-centers are against the poison; yet the brain of the frog, an animal very susceptible to tetanus, has no antitoxic power. Tetanus-toxin is not destroyed by mixing it with brain-substance, and the value of the latter should be attributed to an intervention of the body of the inoculated animal. The mixture of toxin and brain-substance produces considerable inflammation in the tissues, and this reaction attracts a number of leukocytes, which are not only capable of destroying microorganisms, but also of absorbing toxic substances.

The Antitetanic Properties of the Nervous Centers of Healthy Animals.—A. Marie³ has made a number of experiments on rabbits to determine the properties of the nerve-centers with regard to tetanus-toxin. He triturated the entire brain of a normal animal and diluted it with 20 c.c. of sterile salt solution. Then he inoculated a rabbit with $\frac{1}{4}$ mg. of tetanus-toxin (the minimum fatal dose was $\frac{1}{10}$ mg.). A second rabbit of the same weight was injected with $\frac{1}{4}$ mg. of toxin and 1 c.c. of the brain-emulsion. The third rabbit received $\frac{1}{4}$ mg. of toxin and 4 c.c. of emulsion. The first animal died of tetanus on the fourth day; the third presented no signs of the disease; the second showed slight tetanic symptoms, and died on the twentieth day. The brain will not protect an animal against the action of the free toxin; but if the toxin is incorporated with the emulsion, then the protective power is

¹ Ann. de l'Inst. Pasteur, Nov., 1897.

² Ibid., Feb., 1898.

³ Ibid.

manifested. It seems that a previous contact of the two substances is indispensable for success.

The Mode of Destruction of Bacteria in the Body.—Cantacuzène¹ believes that the phagocytes are the only destructive agents of bacteria in the body, both in active and passive immunity. If phagocytic activity is suspended, as, for example, by subjecting an animal to narcosis, the animal dies. In the case of passive immunity, in which an injection of serum causes an extracellular transformation of bacteria into the granules of Pfeiffer, the phagocytes are also the real agents in the recovery of the animal. If the leukocytes are prevented, by narcotizing the animal, from englobing the granules, the animal succumbs. The granules represent living microorganisms capable of multiplying. If the transformation into granules is not complete, there is always on the surface of the peritoneum a goodly number of nontransformed vibrios, which form the starting-point of the infection if they are not englobed by leukocytes. The extracellular transformation of bacteria represents in the end only an extension of the phagocytic function. It is intimately related to phagolysis, and is not produced when the latter is prevented. The extracellular transformation is never an extracellular destruction; the final destruction depends on the phagocytes. That the leukocytes are the seat of the bactericidal substance is proved by the fact that the phenomenon of Pfeiffer cannot be obtained under the skin unless leukocytes are placed in contact with the serum, as by adding pus to the injected mixture.

The Place of Formation of the Cholera Antibodies.—R. Pfeiffer and Marx² accept Ehrlich's ingenious hypothesis of the formation of antitoxins. The antitoxin, according to Ehrlich, as stated above, is nothing else than that cell-constituent which combines with the toxin. Through the combination of the toxin-molecule with the "toxophorous" lateral chains of the cell-protoplasm a defect is produced which acts as a stimulus, and leads to the excessive formation of the used-up substance, whereupon the surplus of this substance enters the blood and acts as an antitoxin. The experiments of Wassermann lend distinct support to this theory; but Pfeiffer and Marx do not think that the theory explains the formation of specific antibodies—i. e., bactericidal bodies. There is no reason to think that the cholera antibodies exist preformed in the normal organism. Their experiments were designed to reveal the place of formation of these substances, the starting-point of their researches being the fact that a single injection of a dead culture of cholera-vibrios into strong young rabbits is followed, in the course of a few days, by a marked specific blood-change. They first investigated the question as to whether the leukocytes were the bearers of the bactericidal substance or not. Without detailing their interesting experiments, suffice it to say that neither the leukocytes of the blood nor of inflammatory exudates are the carriers of the protective bodies. They then studied the activity of the juice of various organs, and found that the spleen, bone-marrow, lymph-glands, and, possibly, the lungs, contained larger quantities of active substances than were demonstrable in the circulating blood. The spleen, indeed, had active bactericidal power before the blood showed any such action. Removal of the spleen does not interfere with the prompt development of bactericidal bodies, probably, the authors think, because other organs (marrow and lymph-glands) unfold a vicarious activity.

Antivenomous and Antitoxic Qualities of the Bile of Serpents and Other Animals.—Fraser³ has shown that animals are insusceptible to the action of venom when that substance is introduced into the stomach,

¹ Ann. de l'Inst. Pasteur, Apr., 1898.

² Zeit. f. Hyg. u. Infectiouskr., Band xxvii., Heft 2, Apr., 1898.

³ Brit. Med. Jour., July 17, 1897.

although the venom is not rendered innocuous by the gastric secretions. It may therefore be assumed that the stomach-walls are incapable of absorbing it. If, like other poisons, it is absorbable from the intestines, the inability to produce toxic symptoms can only be explained by assuming that its toxic qualities are in some way modified in the intestinal canal, probably by the bile or pancreatic secretion. Experiments show that whatever the influence of other secretions on intestinal absorption, that of the bile is so decided as to be sufficient to account for the innocuousness of the administration of venom by the stomach. The bile of venomous serpents when mixed with the venom of serpents prevented otherwise lethal doses of the latter from producing death. It was found, indeed, that a quantity of bile actually smaller than the quantity of venom was sufficient for the purpose. The bile of innocuous serpents and of other animals was also examined. All serpents, innocuous as well as venomous, exhibited signs of resistance to the toxic action of venom introduced subcutaneously or directly into the circulation, which resistance is not dependent on their being cold-blooded animals. It seems probable that innocuous as well as venomous serpents possess poison-glands that secrete venom; but the former are not furnished with weapons of defence in the form of poison-fangs. Most probably the relative protection against the poisonous action of venom introduced into their circulation is dependent upon the effect produced upon them by the venom which they all secrete. The bile of the ox is also antagonistic to serpent's venom; its power, however, being about one-seventieth of that of the strength of venom. The bile of venomous serpents and the bile of rabbits and guinea-pigs also possess antivenomous properties. Assuming that the potency of the bile is dependent upon some specific substance, Fraser attempted to isolate the latter from the bile of venomous serpents. He obtained from the alcoholic precipitate of the bile a part soluble in water, which had antivenomous properties. Another point of interest is that when the bile and venom are mixed *in vitro* the antagonizing power of the former is very slight; while if the venom is first injected and the bile afterward, it will require from 1600 to 2000 times more of the latter than when the two substances are mixed beforehand. In such large doses the bile is toxic.

The Influence of Experimental Alcoholism on Immunity.—A. Deléarde,¹ experimenting with tetanus and anthrax, found that animals treated with alcohol after they had been vaccinated lost their immunity; if treated with alcohol during the vaccination-period, they acquired immunity with difficulty; if the vaccination was begun after the treatment with alcohol, it was only successful if the latter was stopped at the beginning of the vaccination. In the case of anthrax it was impossible to immunize animals while they were being treated with alcohol. [The author inveighs against the use of large doses of alcohol in the infectious diseases of man.]

AGGLUTINATION.

Studies on Typhoid Serum.—Jas. Levy and Gissler² condemn the dry method of making Widal's test, and recommend the use of a tube-bulb like that for counting white corpuscles. They find that no distinct relation exists between the agglutinating power of the serum and the period or severity of the disease. An increase in the vigor of the reaction denotes an increase in the degree of immunity that the individual has obtained; but there is no real relation between these two properties. Serums of the same potency may have different agglutinating powers. The agglutinating power was not found in the

¹ Ann. de l'Inst. Pasteur, Nov., 1897.

² Münch. med. Woch., Dec. 21, 1897.

fluid from serous cavities in a fatal case of typhoid showing a low reaction. It was never found in the urine, and only to a small degree in the milk of a strongly immunized goat. Both the blood-plasma and the pus from a typhoid patient gave a typical reaction. In 10 of 22 cases in which the urine was examined the typhoid bacillus was present, usually at the height of the fever and in conjunction with albuminuria. They finally conclude that Widal's reaction is a reaction of immunity, but by no means the only quality of the serum representing this condition. [It is difficult to conceive how the reaction can be indicative of immunity—it disappears, at times, very soon after the fever; it may be absent during a first attack and appear during a relapse, and in other ways behaves rather erratically, so that it can scarcely denote immunity, as the authors claim.]

The Specific Action of Normal Serum upon the Colon-bacillus.—S. R. Christopher¹ found that a number of colon-bacilli were agglutinated by human serum, independent of the fact whether it was from a typhoid patient or not.

Researches on the Agglutinating Substance.—Nicolle² has made some interesting investigations, chiefly a repetition and an amplification of those of Kraus, by which he has shown that the agglutinating substance (or agglutinable substance) is contained not alone in the bodies of the bacteria, but also in filtered cultures. We give the author's general conclusions at length, on account of their great interest. The bodies of certain microorganisms contain a special substance—an agglutinating or agglutinable substance—with the existence of which the phenomenon of agglutination is connected. The living microorganisms and those killed by heat or by the addition of certain antiseptic substances react practically in the same manner. Filtered cultures treated with serum likewise give rise to the production of masses visible to the naked eye, and, microscopically, in every way identical with bacterial masses, with which they also share the reactions to stains. This phenomenon, for the production of which a sojourn in the incubator of from 15 to 20 hours is necessary, is constant when cultures of a certain age are employed; it is more rapid in the case of old cultures. In order to demonstrate the agglutination more promptly and more distinctly, one can add to the filtered liquid powdered tale or, better, a young culture of another microorganism: the agglutination by means of the serum is then usually produced in three-quarters of an hour at room-temperature. The reactions are specific; only homologous serum produces them. The bodies of the bacteria, washed in distilled water, when they come from a young culture are rapidly agglutinated by the serum; they react only feebly and slowly when the culture is old. Maceration-liquid from young cultures behaves like the fluid of filtered cultures. These various reactions are of no practical value in the serodiagnosis of diseases; the employment of living recent cultures is then preferable. The presence of the agglutinating substance in the bodies of the bacteria is constant, regardless of the conditions under which the culture is made or the nature of the medium employed; the agglutinating substance is an integral part of the microorganism. The agglutinating substance is very resistant to diverse physical agents, such as heat, cold, sunlight, high pressure, desiccation. The addition of certain antiseptic substances to the cultures does not prevent the production of the phenomenon. The agglutinating substance is soluble in water, in alkaline and acid solutions, in absolute alcohol, and in ether. The production of the agglutinating power in the serum of an animal infected with a microorganism is dependent on the inoculation of the agglutinating substance. Causes which enfeeble or destroy it prevent or retard the

¹ Brit. Med. Jour., Jan. 8, 1898.

² Ann. de l'Inst. Pasteur, Mar. 25, 1898.

appearance of the agglutinating power in the serum of the animal. For the production of an active agglutinating power nothing equals the inoculation of living cultures. At the beginning of its life the agglutinating principle is contained only in the body of the bacterium. It is only later, when the microorganism becomes disintegrated, that the substance passes into the liquid. The nature of the agglutinating substance is hardly known as yet; Kraus found peptones and alkali-albumins in the precipitate produced by the serum from filtered cultures of the cholera-vibrio; but these observations are quite vague. The production of the agglutinating substance bears no relation to the virulence or toxicity of the cultures employed. The agglutinating substance of the typhoid bacillus differs essentially from the typhoid toxin described by Chantemesse. That which characterizes the agglutinating substance is the property of agglomerating in masses and agglomerating with itself, under the influence of active serum, the bodies which it contains or which are in suspension in the liquid in which they are found. (If to a mixture, in equal parts, of living typhoid and colon-bacilli one or the other homologous serum is added, all of the microorganisms are agglutinated.) In the filtered bouillon the agglutinating substance which was in solution becomes visible; it seems as if the serum acted upon it so as to render it insoluble. The agglutinating substance is contained in the outer layer of the microorganisms. If an agglutinable bacterium is inoculated on sterile bouillon containing homologous serum, the microbe always develops well. The only peculiarity which prevents this microorganism from being identical with a culture on ordinary bouillon is that its external layer, under the influence of the active serum, swells and becomes apparent and adheres to the external layer of neighboring individuals. Nicolle therefore adopts Gruber's view that agglutination consists in the coagulation and coalescence of the outer layers of agglutinable microorganisms under the influence of agglutinating serum. Agglutination is, then, a purely passive phenomenon. It has nothing in common with immunity, nor is it, properly speaking, a sign of infection, since microorganisms totally deprived of their virulence or a filtered culture can produce it after inoculation. It is simply the sign of the passage into the organism of the specific agglutinating substance.

Widal and Sicard¹ remark that dead cultures of the typhoid bacillus, as well as filtered cultures of typhoid, cholera-, and plague-bacilli, are agglutinated by the addition of their respective serums. Nicolle² found that the flocculi produced by agglutination in filtered cultures were almost identical in appearance with the microbial masses. The authors have made experiments in this line, and found agglutination of filtered cultures by typhoid serum in the relation of 10:1. The agglutinating power of the serum upon the filtered culture is not in the least proportional to its agglutinating power on the bacilli itself. If typhoid bacilli are allowed to macerate in bouillon, but little of the agglutinable substance escapes, even if the maceration is prolonged for 15 minutes; serum having the agglutinating power of 1:20,000 causes only a slight turbidity in the filtered culture, in a strength 1:10. It would seem that the more powerful agglutination of the bacillary cultures is due to some physical action of the microbial bodies. Nicolle found, for example, that agglutination appeared more promptly when he added an inert substance, like powdered tale, to the filtered culture. Great variations are presented in agglutination of filtered cultures. Sometimes the same serum acting on the same filtered culture produces scarcely any reaction. Furthermore, it must be remembered that in filtered cultures there is at times a spontaneous precipitate that looks like agglutinated masses, and it is important to examine before mixing the filtered culture with the serum.

¹ Gaz. hebdom. de Méd. et de Chir., Apr. 14, 1898.

² Loc. cit.

Appearance in the Blood-serum, under the Influence of Chemic Products, of a Substance Capable of Agglutinating the Bacillus of Tuberculosis.—S. Arloing¹ was able to cause the appearance in the blood-serum of goats of a principle agglutinating tubercle-bacilli by repeated injections of eucalyptol, guaiacol, creosote, or Mialhe's solution (corrosive sublimate). As none of these substances has any agglutinating power outside of the body, it must be assumed that they produce in the body certain chemic properties of which they themselves are devoid.

MISCELLANEOUS.

The Protection Afforded against Infection by a Crust following a Burn or Cauterization.—Paul Cohn² produced eschars by silver nitrate and by cauterizing, and then inoculated them with anthrax- or cholera-bacilli. All the animals in which the eschar had been produced by silver nitrate survived; 4 out of 9 in which the eschar was produced by the cautery died. [These researches may serve to explain the beneficial action of silver nitrate as an antiseptic in the throat against diphtheria, and perhaps in the urethra against gonorrhea.]

Visceral Changes in Extensive Superficial Burns.—Charles R. Bardeen³ reviews the various theories that have been advanced for the explanation of the fatal effects of superficial burns. He has had an opportunity of studying the lesions in 5 children fatally burned, upon all of whom autopsies were made. The chief gross morbid changes were swelling of the liver and kidney, softening and enlargement of the spleen, and, above all, swelling of the lymph-glands and of the gastric and intestinal follicles. Microscopically the lesions consisted of parenchymatous degeneration in the liver, kidneys, and lymphatic structures. The lesions of the lymphatic elements were widely distributed through the body and of great severity in view of the few hours elapsing between the burning and death. By reason of their specific and focal nature the lesions closely resembled those produced experimentally in animals by the injection of diphtheria-toxin, abrin, ricin, and other so-called toxalbumins, and are most important evidence of a toxemia after superficial burns. Neither destruction of the red corpuscles nor thrombosis played so prominent a part in producing death as did the toxin in the blood-plasma. The rapidity with which the lymphatic lesions developed was one of the most striking features.

Blood-poisons and Organ-poisons.—Brieger and Uhlenhuth⁴ find that the blood-serum of men, sheep, hogs, cattle, and rabbits contains toxins that cause necrosis, and that these toxins are increased in quantity in cases of disease. They can be precipitated from the serum by alcohol, ammonium sulphate, and the chlorids of the heavy metals. They are not present in the serum of horses. The organs of the animals in which the toxins were found were also poisonous. Death usually occurs in guinea-pigs in from 10 to 12 hours after the injection of an emulsion of the organ. Curiously enough, these toxic substances were found also in the brain of the horse, although the blood-serum of this animal was free from them. In all cases there were marked redness of the suprarenal capsules and changes in the ganglion-cells of the spinal cord. The serum of patients dying from carcinomatous coma or uremia was not more poisonous than that of normal individuals; the organs, however, contained a great

¹ Bull. Acad. des Sci., Séance du 31 Mai, 1898; Sem. méd., June 8, 1898.

² Berlin. klin. Woch., Dec. 27, 1897.

³ Jour. Exper. Med., Sept., 1897.

⁴ Deutsch. med. Woch., Mar. 10, 1898.

excess of toxin. The toxins can be extracted from the organs by alkalies, but not by physiologic salt solution. Acids and boiling destroy them; they lose their toxic quality if heated to 80° C. for half an hour, but retain it if heated only to 70° C. for one-quarter of an hour. It is suggested that there may be some difference between the toxin of the serum and that of the organs.

The Action of the Intraperitoneal Injection of the Contents of Ovarian Cysts.—Auché and Chavannez¹ have studied the effects following injection of the fluid of ovarian cysts into the peritoneal cavity of the rabbit, and conclude: First, that in the absence of suppuration the contents of proliferous cysts of the ovary and of cysts of the parovarium are absolutely aseptic, even if these cysts are adherent to the intestine or if the pedicle is twisted. Second, the toxicity of the contents of proliferous cysts of the ovary is variable. Third, the toxicity of the fluid from parovarian cysts is much less, and is comparable to that of sterilized artificial serum, which is almost *nil*. Fourth, the fluids injected may be classified, as to their toxicity, in the following descending scale: (a) fluid from proliferous cysts of the ovary, (b) sterilized distilled water, and (c) sterilized artificial serum and the contents of parovarian cysts. Fifth, in all cases, whether the animals die or recover, the injection of fluid from proliferous cysts results in marked prostration and diminution in weight. Sixth, with fluid from parovarian cysts these changes are insignificant. The injections in no instance caused a rise in temperature. When fluid from proliferous cysts had been injected there was a progressive fall of temperature in those cases in which death supervened within a few days. Seventh, fluid from parovarian cysts, if injected in large quantities, produced a marked fall of temperature for 24 or 36 hours. Eighth, unless death takes place too rapidly, the liquid is always completely absorbed. Elimination takes place through the kidneys, and may possibly be assisted by the intestine. Ninth, solid residue from proliferous cysts, when placed in the abdominal cavity, becomes collected into little masses situated on the surface, that disappear sooner or later. Tenth, the microscopic lesions consist in infiltration of the cellular tissue of the abdominal wall, of the axilla, of the mediastinum, of the subperitoneal or mesenteric tissue, and even of the cellular tissue of the wall of the bowel. In some cases fluid has been found in the pleura and in the pericardium. There is, frequently, vascularization of the mesentery and of the small intestine, and, more rarely, of the large intestine and of the stomach. Eleventh, the peritoneum is never infected by the fluid injected.

The Action of Butyric Acid and β -oxybutyric Acid.—W. Sternberg² comes to the conclusion that diabetic coma is due to β -oxybutyric acid, which, accumulating in the blood, leads to a reduction in alkalies, which reduction is the cause of the coma.

The Pathogenic Role of Dust.—Kelsch and Simonin³ call attention to the disease-producing properties of the dust of streets and human habitations, and cite the cases of 2 soldiers who, in consequence of a wound on the foot, developed tuberculous lymphangitis, followed by general tuberculosis. Both were strong men without family-taint. The authors refer to 2 circumscribed outbreaks of typhoid fever manifestly arising from contamination of the dust of a floor. They then describe the technic of bacteriologic analysis of dust. From the dust on the floor of one hospital they were able to isolate staphylococcus pyogenes albus and aureus, bacillus pyocyaneus, the pneumobacillus of Friedländer, and the bacillus coli communis.

A Modification of the Ziehl-Neelsen Method of Staining

¹ Arch. de Méd. expér. et d'Anat. path., Jan. and Mar., 1898.

² Virchow's Archiv, Band clii., S. 207.

³ Bull. de l'Acad. de Méd., Oct., 1897.

Tubercle-bacilli.—N. P. Andrejew,¹ instead of Gabbet's solution for decolorizing and counterstaining the tubercle-bacilli, recommends that after the sputum has been stained on the slide with carbol-fuchsin, and the latter washed off with water, the preparation be treated with a solution composed of a hot 10% solution of potassium chlorate, 100 c.c.; Säuregrün, 1 g.; and 25% solution of sulphuric acid (specific gravity 1.182), 15 c.c. This is kept on the slide until the fuchsin-color has disappeared and the film looks uniformly green or greenish-blue.

Phosphotungstic-acid Hematoxylin for certain Tissue-elements.—Mallory² recommends the following solution as a more or less perfect stain for certain tissue-elements: Hematoxylin, 0.1 g.; phosphotungstic acid (Merek) (1% aqueous solution), 100 c.c. Dissolve the hematoxylin in a little hot water and add when cool to the dilute acid solution. The color, at first greenish, turns in a few minutes to a reddish-brown of slight intensity. The solution is ready at once, and will keep for months if not exposed to too much light. Directions for staining: 1. Stain sections 2 to 24 hours. 2. Wash in water. 3. Dehydrate in alcohol. 4. Clear in oleum origani cretici. 5. Mount in xylol-balsam. Although the time for staining is long, a stronger solution has not been found advisable. Prolonged washing in alcohol will remove most or all of the pink color. Celloidin remains unstained. After any fixative, nuclei by this method are stained blue, while connective-tissue fibers and the intercellular substances of bone, cartilage, and the cornea are stained a light to a deep pink. If the staining is prolonged the cell-protoplasm is usually colored a light blue.

A Modified Fluid for General Histologic and Neurohistologic Purposes, and a Staining-combination of Gentian-violet and Picric-acid Fuchsin.—Ohlmacher³ has modified Carnoy's fixative by adding corrosive sublimate, and finds this a most valuable fluid for fixing and hardening, both for nervous and other tissues. The formula employed by him is as follows: Anhydrous alcohol, 80 parts; chloroform, 15 parts; glacial acetic acid, 5 parts; corrosive sublimate to saturation. About 20 g. of corrosive sublimate (powdered) are required slightly to oversaturate 100 c.c. of fluid. Ordinary pieces of tissue are usually fixed in from 15 minutes to one-half hour. After fixation the tissue is washed in a bath of 80% alcohol, and placed in alcohol of this strength for preservation. The removal of the sublimate is hastened either by adding gum-camphor or tincture of iodine from time to time, until the yellow color is no longer discharged. For microscopic purposes the fixed tissue is removed to absolute alcohol or 95% alcohol for dehydration, cleared in cedar-wood oil or bergamot-oil, and embedded in paraffin. Where an early microscopic examination is desirable it is not necessary to wait for the removal of the sublimate, for this can be effected by treatment with tincture of iodine after the sections are affixed to the slides. For staining, gentian-violet is employed, instead of hematoxylin, in Van Gieson's method. The section is stained on the slide with Ehrlich's anilin-water-gentian-violet one minute. The excess of stain is drained off and the section washed with water; it is then treated with picric-acid-fuchsin solution, thoroughly washed with water, then with absolute alcohol, cleared with oil of cloves, and mounted in xylol-balsam.

Concerning the Use of Soudan III. in Clinical Microscopy.—Hermann Rieder⁴ says that soudan III. is recommended by L. Daddi, of Turin, as a stain for fat. It is a diazo-compound, insoluble in water, but

¹ Centralbl. f. Bakt. Parasit. u. Infectiönskr., Dec. 7, 1897.

² Jour. Exper. Med., Sept., 1897.

³ Ibid., Nov., 1897.

⁴ Deutsch. Arch. f. klin. Med., Dec. 9, 1897.

soluble in alcohol, ether, chloroform, xylol, fatty and ethereal oils. Soudan III. stains fat red, but can only be employed with tissues that have been fixed in Müller's fluid or have been cut by the freezing-method. Paraffin- and celloidin-embedding cannot be used. The tissues must not be dehydrated in absolute alcohol, nor cleared in bergamot-, cedar-, turpentine-, or clove-oil; nor must they be decolorized in anilin-oil or xylol, nor mounted in Canada balsam. Glycerin is the best mounting-medium. Hematoxylin can be used as a stain for the other tissues, which are entirely unattacked by the soudan. Clinically, staining with soudan III. can be employed in lipemia, lipuria, chyluria, in a study of milk, colostrum, epithelial and granule-cells, and renal casts; likewise in a study of stomach-contents, feces, sputum, excised pieces of muscle in progressive muscular dy-trophy, etc. In such cases a saturated alcoholic solution (96% alcohol) should be made and filtered. Of this, one-third of a small pipetful is placed in a test-tube, and an equal quantity of the substance to be studied—as, for example, urinary sediment—and an equal quantity of 96% alcohol are added. The solid elements quickly settle to the bottom and can be examined under the microscope for fat. By allowing 60% or 70% alcohol to flow under the cover and absorbing it with blotting-paper the preparation can be freed from an excess of soudan III. Fatty acids are also stained with the dye. The author took up the question whether eosinophile granules of leukocytes were fatty or not. He found that they did not take the soudan III. stain, and thinks, like most authorities, that they are probably proteid in nature.

New Methods of Staining Axis-cylinders of Nerves.—H. F. Harris¹ finds toluidin-blue a valuable stain for the axis-cylinders of nerves. Solutions of it may be injected into the living animal, or pieces of fresh tissue may be placed in solutions of the stain. For staining the nerves a weak solution is much to be preferred, the best results having been obtained with solutions of 1:1000 to 1:4000. He recommends the following formula: Toluidin-blue in physiologic salt-solution, 1:1000, 2 parts; ammonium chlorid in water (0.25%), 1 part. The solution should be freshly prepared. The tissue should never be covered by the solution, but from time to time only enough should be added to keep it moist. The staining is generally complete in from one-half to one hour. It is advisable to keep the tissue in a moist chamber at a temperature about 37° C. while staining. As soon as the desired degree of intensity of the stain is secured the specimen is rinsed in water and transferred to a saturated solution of either potassium ferrocyanid or ferricyanid which has been cooled to within a few degrees of zero. A trace of osmic acid added prevents the slight macerating effect which would otherwise be observed. At this temperature it should remain until it is removed at the end of from 3 to 24 hours. It is washed for an hour in distilled water, and then dehydrated in absolute alcohol, which should be kept at a low temperature. After dehydration, the specimen is cleared in xylol or cedar-wood oil and embedded in paraffin.

¹ Proc. Path. Soc. of Phila., N. S., No. 8.

NERVOUS AND MENTAL DISEASES.

BY ARCHIBALD CHURCH, M. D.,

OF CHICAGO.

Introductory Resume.—During the year embraced in the present contribution further additions have been made to our knowledge of family diseases, which is an important and growing subject. The physiologic basis of tremor and the form known as hereditary tremor have been carefully studied. Important additions to the bacteriology of meningitis have appeared, particularly the work of Councilman. The subject of encephalitis has received numerous additions, and the much-neglected subject of hemiplegia from cerebral lesions and the treatment of the hemiplegic state, especially as occurring in children, have been carefully studied. Several contributions regarding hemiplegia subsequent to acute infections have appeared. The etiology of sun-stroke is gradually being brought into the realm of infection. In brain-tumor the use of the X-rays and percussion as diagnostic measures are new methods that promise some advantage. In the surgical treatment of hydrocephalus the establishment of permanent subcutaneous drainage has gathered additional support. In multiple neuritis changes in the spinal cord are now suspected as a matter of course, and are shown by nearly every careful reporter.

Spinal puncture, of which so much has been said in previous editions of the YEAR-BOOK, has found a firm resting-place as a diagnostic measure, and has shown itself to be of occasional therapeutic value in relieving brain-pressure. Landry's paralysis has now definitely gone into the ranks of acute infectious myelitis; and the relation of acute poliomyelitis to the arterial supply of the cord, which serves as an avenue for the infection, is more clearly recognized and has been experimentally proved. The etiology of syringomyelia has been ably considered in a number of important papers. The subject of cord-changes subsequent to all forms of pernicious anemia has received numerous additions.

Of tabes, there seems to be growing material indicating primary changes in the posterior root-ganglion and in the terminal nerve-bodies, including the Pacinian corpuscles and the muscle-spindles. This multiform disease is constantly giving occasion for the recognition of new symptoms, among which in this issue are embraced ocular crises and intermittent Argyll-Robertson pupil. A further study of tabetic anesthetics has been made. The belief that tabes is invariably postsyphilitic gains new adherents.

In the treatment of tetanus the use of antitoxin is now recognized to be of advantage; but, like all other methods, offers the best results in proportion as it is employed early and in inverse proportion to the severity of the disease, which is estimated by the length of time intervening between infection and the onset of symptoms. The intracerebral injection of serum to reach promptly the locus of disease-activity has been advocated, and in one instance seems to have been of the greatest benefit.

Additions to the postmortem material of acromegaly invariably furnish records of pituitary tumors. The surgical treatment of exophthalmic goiter,

whether by operations upon the thyroid or upon the sympathetic ganglia in the neck, furnishes grounds for active contention. Myxedema, cretinism, and infantilism, in relation to the thyroid and the physiology of the thyroid, have all been energetically studied during the year.

The relation of hysteria and neurasthenia to pelvic disorders has been considered by a number of able writers, and has reached a more definite status. Ohlmacher has suggested that epilepsy may have some association with a persistent thyroid and other glandular structures, and to his thesis he brings the supporting results of autopsical investigation in 7 cases. The cerebral origin of epileptic attacks has received further confirmation in a case in which the cortex was stimulated by electricity without the previous use of an anesthetic, the patient being able to describe sensations as they occurred. The case also furnishes valuable evidence on the sensory function of the cortex of the motor zone. The subject of tie is gaining in importance, and the recognition of tie-disease in all its varieties has been clearly stated. The relation of migraine to epilepsy has received valuable support.

In the treatment of mental diseases the value of surgical operations, especially in relation to pelvic diseases of women, has been carefully investigated, and a number of additional reports on the bed-treatment of insanity are now available. The interesting subject of the relation of bodily disease to mental disturbances and the modification of insanity by physical conditions has been discussed anew. The treatment of parietic dementia by the wet pack, and practical proof of its luetic origin, are noted. A well-considered paper by Frederick Peterson on katatonia indicates that this is not a well-defined mental disease.

SYMPTOMATOLOGY AND SYMPTOMATIC DISORDERS.

Myotonia.—W. von Bechterew¹ speaks of the treatment of this disease. The patient was a medical practitioner who had been under observation. Under the influence of gymnastics and massage there was marked improvement for a considerable period of time, and the patient had reached a point where the myotonia was scarcely noticeable. George W. Jacoby² publishes a paper which was read before the American Neurologic Association on the subject of myotonia, with several clinical histories. He would limit the term congenital myotonia to cases (1) presenting an hereditary etiology, either as a direct transfer from the ascendant or by inherent disposition; (2) manifesting the myotonic disorder of movement—namely, intention-spasm; and (3) showing the myotonic reaction, which he describes as made up of normal mechanic and faradic excitability of the nerves and increased mechanic and faradic excitability of the muscles, anodal and cathodal contractions being equal and the response always being tonic and prolonged; (4) presenting hypertrophy of the enlarged muscle; (5) absence of symptoms pointing to gross involvement of the nervous system. Other varieties of myotonia he would denominate myotonia acquisita, as describing those acquired subsequent to birth; and myotonia transitoria, for the cases due to exposure to cold, etc. Examination of muscular tissue taken *infra vitam* from 1 case showed that the muscles which were not allowed to contract after they were excised presented exactly the same appearance as normal muscle from the cadaver; while those portions in which contraction was not prevented presented the feeble striation, enlarged rounded muscle-bundle, and apparent increase of nuclei and other features considered indicative of the disease. He is inclined to attribute the acquired cases to some

¹ Neurol. Centralbl., Nov., 1897.

² Jour. Nerv. and Ment. Dis., July, 1898.

form of intoxication, and believes that this acts, in all probability, through the nerve-nuclei.

Of perhaps a kindred nature is **family periodic paralysis**. E. W. Taylor¹ calls attention to this rare disease, stating that the affection is characterized in its typical form by extensive, flaccid motor paralysis, associated with loss of reflex and electric excitability, without sensory or psychic disturbance of any sort, and with intervals of perfect health. The disturbance is periodic, and the predisposition to its development is clearly hereditary. In his own patients, brother and sister, the disease was traceable for 5 generations. It seems to have been transmitted both by male and female. The first case, as far as his investigation went, appeared in a male. A synopsis of 25 cases is appended, which practically covers the literature of the subject.

Tremor.—Wegge² reports a case of **hereditary tremor** occurring in a female school-teacher. It began at the age of 21, and was increased and perhaps induced by overwork and nervous strain. The tremor does not show in the handwriting, but the patient is somewhat depressed and neurasthenic. In the family history the father has been nervous and afflicted with a tremor of the hands since some time before his marriage. His mother had tremor of the head at 35. The patient's mother's half-sister was insane at the age of 18, and died insane at the age of 60. The mother's father was periodically insane. One of the patient's sisters died during confinement, at the age of 35. Another sister, aged 25, has had tremor of the head for several years. A third sister, aged 15, has had tremor of the head and hand since childhood. [There is a growing impression that hereditary tremor is a manifestation of degeneration, and in fact the family-histories of these patients are surcharged with psychoses. It has recently been proved that even in health there is a tremor which may be imperceptible to ordinary methods of observation, and that a tremor of pronounced character is but an exaggeration of the vibration which is physiologic and which tends to appear during mental disturbance, as in fright, even in normal individuals.]

A. A. Eshner,³ as a result of an extended series of experiments and observations on the question of tremor, reaches the following conclusions: 1. All muscular movements are made up of a series of elementary contractions and relaxations, which may be appreciable as tremors in conditions of both health and disease. 2. The differences between different tremors are of degree rather than of kind—*i. e.*, no form of tremor is distinctive of any one disease or group of diseases. 3. No definite relation exists between one form of tremor and any other. 4. The frequency of movement is in inverse ratio to the amplitude, and *vice versa*. 5. Habitual movements are performed with greater freedom from tremor than unusual movements. 6. There is no material difference between the movements of the two sides of the body, except as related to proposition 5.

Headache from Nasal Causes.—Sargent F. Snow⁴ refers to his experience in the management of headaches of a unilateral or diffuse character in which there were disturbances within the nasal cavity. He selects 30 cases which had been referred to him by different physicians after other measures, including correction of eye-difficulties, had been employed. As a result of the correction of the nasal disturbance, of the 30, 7 claimed to have received some benefit, which he estimates at 40%; 5 were relieved to the amount of 75%, 10 to the amount of 90%; and in 8 there was complete cure. A tabulated list of the cases, showing the intranasal conditions, follows. [The usual nasal

¹ Jour. Nerv. and Ment. Dis., Sept., 1898.

² Jour. Am. Med. Assoc., Jan. 30, 1897.

³ Jour. Exper. Med., 1897.

⁴ Med. News, July 10, 1897.

headache is frontal; but when the branches of the fifth cranial nerve are affected a unilateral browache or faceache may be induced.]

Mirror-speech.—Doyen¹ was the first to observe this form of speech, which is analogous to mirror-writing. The words are either pronounced as if spelled backward or the syllables are rearranged backward for each word, in either case resulting in jargon, the true nature of which is only detected by writing down the sounds as pronounced. Similar conditions have been noted by Grasse and Baudouin. It is usually temporary, follows cerebral lesions and operations, and may be hysterical.

Morbid Blushing.—W. von Bechterew,² under the title of “Eroethung-sangst,” calls attention to his former contribution on this subject, and adds 2 new cases in which patients under any mental stress or the slightest embarrassment blush so violently that life is made miserable. Both cases presented signs of neuropathic makeup and the mental attitude of degenerates. In both there was a history of masturbation and other features of a sexual character.

Unilateral Sweating.—H. Tenschler³ reports 2 cases of this character occurring in neurasthenic individuals, and reviews the subject of one-sided hyperhidrosis, giving a classification based upon the writings of Raymond and Kaiser. Such cases have been noted as: 1. Following material change of the central nervous system. 2. Due to affections of the sympathetic. 3. The result of affections of the facialis or trigeminus. 4. Reflex disturbance. 5. Resulting from infectious diseases without other disturbance of the nervous system. He would add a sort of idiopathic variety indicative of individual degeneration, usually associated with neurasthenic and neurotic concomitants. [It has been observed in traumatic neurasthenia without other indication of head-injury and no history of cephalic concussion.]

Nevus and its Relation to Nervous Territories.—G. Etienne⁴ reports several cases in which birthmarks were sharply limited to the cutaneous distribution of nerves, the first being outlined by the distribution of the superficial cervical plexus, and several being confined to the distribution of the costal branches. He is inclined to conclude that nevus has its origin in an intra-uterine nervous lesion, and may be attributed to an affection of the direct sensory neuron either in the spinal ganglion or in its peripheral prolongation, or it may be affected through its central prolongation in the posterior root or in the cord itself. Nevus may thus be attributable to a prenatal neuritis or myelitis. [The illustrations are very conclusive.]

Unilateral Reflex Iridoplegia.—W. M. Leszynsky⁵ discusses this phenomenon *in extenso*, and reaches the following conclusions: 1. That unilateral reflex iridoplegia is a condition which may arise in tabes or paretic dementia, being confined to one side for an indefinite time before the other pupil becomes similarly affected. 2. That it is also found in cerebral syphilis, and may be permanently limited to one eye. 3. That it often occurs as a remote result of disease of the third nerve or its nucleus, and may be the only demonstrable clinical evidence of a preexisting third-nerve paralysis. 4. That it is always indicative of central nerve-degeneration involving either the oculomotor nucleus or its efferent branches. 5. That it is generally of syphilitic origin. 6. That the lesion producing unilateral reflex iridoplegia is situated in the centrifugal portion of the reflex mechanism.

¹ Am. Medico-Surg. Bull., Jan. 10, 1897.

³ Ibid., Nov. 15, 1897.

² Neurol. Centralbl., Nov., 1897.

⁴ Nouv. Icon. de la Salpêtr., July and Aug., 1897.

⁵ N. Y. Med. Jour., July 31 and Aug. 6, 1898.

DISEASES OF THE CEREBRAL MENINGES AND CRANIAL NERVES.

Meningocele.—W. D. Spanton¹ describes 2 cases of meningocele successfully operated by means of ligature, applied with a Staffordshire knot, to shut off the general meningeal cavity from the meningeal sac, which in each instance contained no brain-substance.

Hemorrhagic Pachymeningitis.—C. A. Herter² reports 2 cases of internal hemorrhagic pachymeningitis in children, and reviews the subject. The author is inclined to believe that it is a very much more common disease than is indicated by text-books, and refers to the remarkable statistics of Doehle, who found it 48 times in 597 children under 10 years of age—that is, more than 17%. It occurred most commonly during the first year of life. The diagnosis during life is necessarily very uncertain, owing to the obscurity of the symptoms; but in the absence of pneumonia and tuberculosis the author is inclined to think that a suspicion of pachymeningitis gains probability. When present, traumatism otherwise insignificant is capable of setting up a subdural hemorrhage which may produce either palsy or death.

Cerebrospinal Meningitis.—W. T. Councilman³ reports upon an epidemic of cerebrospinal meningitis in Boston, 111 cases of the disease being treated in the various hospitals. Upon careful bacteriologic examination he reached the conclusion that the epidemic form is due to the *Meningococcus intracellularis*, and believes that this is a distinct organism, not to be confounded with the *Micrococcus lanceolatus* or the *pneumococcus*. In the discussion of his paper Welch pointed out: 1. It is possible the *Meningococcus cellularis* is not the sole specific cause of epidemic cerebrospinal meningitis, but that the *pneumococcus* may also cause it. 2. That there may be mixed infection or secondary infection by the *pneumococcus*, and that the *meningococcus* may be overlooked. 3. It is probable in some cases that the *meningococcus* has been mistaken for the *pneumococcus*. He was also inclined to think that the *pneumococcus* and the *meningococcus* may even be varieties of the same bacterium. Schiff⁴ has observed the presence of Weichselbaum's *Meningococcus intracellularis* in the nasal secretions of 27 patients with various chronic diseases, all of whom had either normal conditions of the nose or at most a mild chronic catarrh. It would therefore appear that its detection in the nose is not of so much diagnostic importance as has been supposed. It also explains the occurrence of meningitis after skull-fractures and other solutions of continuity affecting the nasal vault. This observer noted that the coccus showed variable pictures under similar technic, especially when stained by Gram's method, which serves to explain some of the contradictory statements of other observers. [The same thing has been recorded by Councilman and others in this country. See reference above.] Stoeltzner⁵ reports the case of a child aged 2½ years. A turbid fluid containing pus was drawn off by spinal puncture, from which the *Meningococcus intracellularis* was cultivated. The patient recovered. The author says the lumbar puncture proved the disease to be suppurative meningitis. Hot baths were employed, 3 being given in a day. [Ordinarily purulent meningitis is considered fatal. This case would prove the possibility of recovery.]

A. P. Ohlmacher⁶ reports 2 cases of **typhoid meningitis**. In case 1 the typhoid fever was of 4 weeks' duration. There was marked delirium in

¹ Brit. Med. Jour., Oct. 9, 1897.

² Bull. Johns Hopkins Hosp., Feb., 1898.

³ Berlin. klin. Woch., Apr. 19, 1897.

⁴ Am. Jour. Med. Sci., Aug., 1898.

⁵ Centralbl. f. innere Med., No. 22, 1898.

⁶ Jour. Am. Med. Assoc., Aug. 28, 1897.

the week preceding death. The autopsy showed the usual typhoid lesions of the fourth week, with acute hemorrhagic internal cerebral pachymeningitis and exudative leptomeningitis. Typhoid bacilli were isolated from the spleen, mesenteric glands, and meninges. In case 2 there was typhoid fever with profound coma and delirium, death following in the fourth week. The usual typhoid lesions were found in the intestines, spleen, and mesenteric glands, with bronchopneumonia. There were extensive purulent cerebral leptomeningitis, ependymitis, and dilatation of the lateral ventricles. Typhoid bacilli in vast numbers were the only organisms found in the meninges.

C. L. Dana¹ describes as **acute serous meningitis** the alcoholic meningitis, or "wet-brain," giving a very full description of this complication, with a number of cases and pathologic findings. In the cases so examined the brain was found rather pale and soft, showing punctate hemorrhages, especially in the deeper parts and in the pons, and occasionally hemorrhagic softening in small points, similar to that occurring in hemorrhagic encephalitis. Microscopic examination shows in the uncomplicated cases the absence of true inflammation. There is often congestion, but the commoner condition is an edema, the perivascular and pericellular spaces being dilated. [We decidedly doubt the expediency of calling this edematous condition of the brain occurring in alcoholics serous meningitis. The meninges are but slightly affected, and the histologic conditions found are not those of inflammation, but those of edema.]

Recurrent Ptoxis.—W. H. Haynes² reports a case of this disease, with anesthesia of the supraorbital nerve. The case is one of paralytic ophthalmic migraine, clearly outlined by Charcot. The attacks are usually ushered in suddenly with neuralgic pains or headache, nausea and vomiting, and paralysis of all branches of the motor oculi. As soon as the paralytic features appear all symptoms except pain cease. In a few days, a few weeks, or a few months the paralysis disappears for a time; but after a varying interval of from weeks to years there is recurrence.

Asthenic Bulbar Paralysis.—M. Mailhouse³ reports a case which he places under this caption, occurring in a child 2½ years old and terminating fatally. It commenced with weakness of the muscles of the neck and inability to hold up the head, loss of facial expression, ptosis, and difficulty in swallowing. These subsided, but recurred a number of times, and the child finally died rather suddenly. No autopsy. He also refers to a case in an adult, reported in the same journal Jan. 20, 1898, by Wheaton, with death 55 days after a sudden onset. The author calls attention to the similarity of the disease in question with Landry's paralysis. Widal and Marenesco⁴ had a patient under observation presenting the symptoms of Erb's syndrome. [See former YEAR-BOOKS.] He examined the specimens postmortem with the methods of Nissl, of Marchi, and of Pal, and found lesions in the nuclei of the third, sixth, seventh, and twelfth cranial and of some upper spinal nerves. These lesions consisted essentially in a disintegration of the chromophilic elements. There was no inflammatory condition, but the small arterioles and capillaries were dilated and hyperemic. Some nerve-fibers of the third, seventh, and twelfth nerves showed a degeneration of the myelin. [The lesions noted by these authors have the same location as those of polioencephalitis superior and inferior, apparently varying only in degree.]

Trifacial Neuralgia.—Bergonie⁵ deduces from an observation of 15

¹ Med. Rec., Dec. 4, 1897.

³ Boston M. and S. Jour., May 12, 1898.

² N. Y. Med. Jour., Feb. 13, 1897.

⁴ Presse méd., Apr. 14, 1897.

⁵ Arch. d'Élect. méd., Oct. 5, 1897.

cases treated by himself, that electricity affords the best means of palliating, if not curing, trifacial neuralgia. He recommends that a constant current of 35 to 50 ma. be used, and the positive electrode be applied to the seat of pain. This electrode should have an area of 200 to 250 square centimeters, the negative being about double the size, to be applied over the spinal column, and each sitting to last at least 15 minutes, or it may exceed half an hour. Great stress is laid upon having the positive pole accurately moulded to the face, exactly covering the painful area. He finds at the end of the application that the affected region has lost its hypersensitiveness and that it may even be quite anesthetic. The same is true of the deep parts, so that mastication, speech, etc., no longer occasion pain. [The best results still follow general treatment in conjunction with Dana's strychnin-plan. See YEAR-BOOK for 1898.] W. W. Keen and W. G. Spiller¹ reported to the American Neurologic Society on 11 cases in which the ganglion had been removed. Keen believes that removal is almost invariably followed by complete relief of pain, and that it is impossible to preserve the motor root. He also favored removal of the entire ganglion, and, as this was a serious undertaking, preferred first to do peripheral operations, unless pain was widespread and involved all the branches of the nerve. He would operate upon the peripheral nerves after 3 or 4 months of unsuccessful medical treatment. Spiller reported upon the microscopic findings in 7 of the ganglia removed by Keen; they all showed intense alteration involving axis-cylinder, myelin-sheath, blood-vessels, and connective tissue. In one case the entire ganglion with its motor and sensory roots was removed, and these roots were found to be normal, although the second and third branches of the nerve near the ganglion were degenerated. The writers agree that trifacial neuralgia is first due to disease of the peripheral branches, and that the ganglion is secondarily involved. In one case both the infraorbital and supraorbital nerves were removed and found degenerated.

Facial Palsy.—Bordier and Fraenkel² study the upward and outward turning of the eye on the affected side in facial palsy on attempts at closing, and believe that it furnishes a valuable prognostic index. The condition is only well marked in those cases in which reaction of degeneration is complete, as when the reaction is only partial or when the lids can be fairly well closed voluntarily patients can prevent this upward and outward deviation of the eyeball. Such cases are slight and easily curable. It is said to be never present in central paralysis of the portio dura. The deviation of the eye becomes less and less as the reaction of degeneration becomes less marked and improvement takes place. In this way the progress of the case can be determined, as well as by electric test of the muscles. The upward and outward turning of the eyeball is due to implication of the inferior oblique, the nucleus for which is located near that for the orbicular fibers of the facialis.

Laryngeal Abductor Paralysis.—Sir Felix Semon³ refers to this subject and calls attention to the vulnerability of the abductors in injuries to the recurrent laryngeal, showing that a lesion which would affect the nerve apparently in all its parts first determines abductor paralysis, and that atrophy in the abductors corresponding to the paralysis precedes that in other laryngeal groups. He also notes the important clinical fact that while the abductors are the first to yield, the adductors are the first to recover. He has also proved by experiments that in animals just killed, if all the muscles of the larynx be stimulated with an irregular faradic current, without exception, even in the most different species of animals—that is, dogs, cats, rabbits, and monkeys,

¹ Med. Rec., p. 65, July 9, 1898.

² Sem. méd., Sept. 8, 1897.

³ Brit. Med. Jour., Jan. 1, 1898.

and even human beings, as has been proved by Jelseme—that the posterior cricoarytenoid muscle, although by far the largest of the laryngeal group, loses its electric excitability long before any of the adductors. He refers to the observations of Risian Russell, who divided the laryngeal nerve into its original bundles, and found that the one supplying the abductor lost its excitability long before those supplying the adductors. He quotes B. Fränkel and Gad, of Berlin, who applied a freezing-mixture to the recurrent laryngeal and found that abduction was always first impaired. Grabower has recently noted that the nerve-endings in the posterior cricoarytenoid muscle are much smaller than those in the laryngeal muscles, and it may be the anatomic basis of their vulnerability. He gives credit to Franklin Hooper, of Boston, who 11 years ago stated that stimulation of the recurrent laryngeal nerve, either cut or uncut, with an electric current of uniform strength, resulted in adduction when ether-narcosis was slight; but under deep anesthesia the same current caused decided abduction. From which the conclusion is drawn that the difference must be due to the influence of the anesthetic upon the terminal elements of the nerve. In other words, there must be a biochemic difference in this antagonistic apparatus.

DISEASES OF THE BRAIN PROPER.

Diffuse Encephalitis, otherwise Polioencephalitis of Children.

—E. Reymond¹ gives the case of a 17-months-old child that had been sick 14 days with various brain-symptoms and presented the following condition: An unusually large head, turned to the left, with left-sided facial weakness, stiff neck, large fontanel still open, soft, quick pulse, occasional vomiting, deep apathy, loud cries at every disturbance, right arm and leg less movable than the left, irregular temperature. A diagnosis of probable tuberculous meningitis was made. Upon section there were found a serous meningitis, serous encephalitis, diffuse encephalitis, and anemia of various organs. Bacteriologic search of the cerebrospinal fluid and the brain-substance was negative. Microscopically various portions of the brain showed soft and thickened membranes, extreme vascular injection, and thickening of the vessel-walls, hypertrophic neuroglia, round-cell and leukocytic infiltration. There was crowding of the perivascular and pericellular spaces, with atrophy, necrosis, and softening of portions of the gray substance. The author believes that this is a confirmation of Strümpell's theory of polioencephalitis anterior, but with a wider distribution of the lesion than was presupposed by Strümpell, who was inclined to limit it to the motor zones. The result of such an encephalitis might be a generalized cortical sclerosis with localized intensities, which might result in many of the manifestations of cerebral palsy in children.

Intradural Pressure after Head-injuries.—W. M. Bullard² reverts to this subject, which he presented four years ago, and adds to the evidence the fact that head-injuries are likely to produce an increase in intradural pressure independent of hemorrhage, and draws the following conclusions: 1. An abnormal increase in the intradural pressure often occurs as an accompaniment or result of severe head-injuries, where no large clot exists. 2. This intradural pressure may be in part due to an excess in the amount of subdural fluid; this, however, is, as a rule, not the chief element in the intradural pressure, which is principally due to the bulging of the brain itself. 3. The cause of this intradural pressure is apparently congestion or filling of the intracranial blood-vessels and the results thereof.

¹ *Jahrb. f. Kinderh.*, Band xlv.

² *Boston M. and S. Jour.*, Mar. 24, 1898.

Cerebral Hemorrhage and Cerebral Thrombosis.—Archibald Church,¹ in a study of the problem of diagnosis, furnishes the following

Table of Differential Probabilities in the Diagnosis of Cerebral Hemorrhage and Cerebral Thrombosis.

	HEMORRHAGE.	THROMBOSIS.
PREDISPOSING CONDITIONS . . .	<p>Frequent before 3 years of age and between 40 and 60.</p> <p>Periarteritis and miliary aneurysm the usual antecedents.</p> <p>Heredity is often marked.</p>	<p>Common in old age and in young adults.</p> <p>Endarteritis, atheroma, endocarditis, cachexia, and embolism.</p> <p>Heredity rare.</p>
INCITING CONDITIONS.	<p>High arterial tension.</p> <p>Excitement, effort, or shock.</p>	<p>Low arterial tension.</p> <p>Rarely excitement or effort, except in embolism. Sleep favors it.</p>
ONSET-CONDITIONS. .	<p>No prodromas.</p> <p>Sudden stroke usual.</p> <p>Coma marked.</p> <p>Rectal temperature reduced and surface-temperature elevated on the paralyzed side.</p> <p>Congested face, respiratory difficulties.</p> <p>Pulse slow, full, bounding.</p> <p>Motor loss usually hemiplegic and fully developed at once.</p> <p>General convulsions common.</p>	<p>Prodromas common.</p> <p>Complete stroke rare.</p> <p>Coma slight or wanting.</p> <p>Temperature usually unchanged.</p> <p>Pale face, no respiratory disturbance.</p> <p>Pulse weak, soft, often frequent.</p> <p>Motor loss often monoplegic and inclined to extend.</p> <p>Limited convulsions common.</p>
COURSE	<p>Rapid improvement in motion.</p> <p>Foot usually gains more rapidly than hand.</p> <p>Anesthesia usually fleeting.</p> <p>Persistent aphasia exceptional.</p> <p>Postplegic athetosis, trembling, and chorea common.</p> <p>Postplegic convulsions rare.</p> <p>Spasmodic weeping and laughter common.</p>	<p>Slow motor improvement. Extension of paralysis often observed.</p> <p>Foot often gains less than hand.</p> <p>Paresthesia persists.</p> <p>Persistent aphasia and other cortical symptoms common.</p> <p>Postplegic athetosis, trembling, and chorea uncommon.</p> <p>Postplegic convulsions common.</p> <p>Spasmodic weeping and laughter exceptional.</p>

R. T. Williamson² reports 8 cases of cerebral hemorrhage, embolism, and thrombosis showing retinal changes corresponding to the cerebral disease, with illustrations of the retinal appearances. He concludes: 1. In cases of hemiplegia from cerebral hemorrhage which terminate fatally, large hemorrhages are not infrequently found in the retina on the same side as the brain-lesion, whilst no hemorrhages are present in the opposite retina. 2. In cerebral embolism the same retinal condition is occasionally met with; also in cerebral embolism occasionally the retinal vessels are slightly dilated on the side of the brain-lesion. 3. In thrombosis of the middle cerebral artery, when the thrombus extends down into the internal carotid, the vessels of the retina on the side of the brain-lesion may be markedly dilated and tortuous, whilst the retinal vessels of the other eye are normal.

W. Kattwinkle,³ under the direction of P. Marie, has made an investiga-

¹ Chicago Med. Recorder, Oct., 1897.

² Brit. Med. Jour., June 11, 1898.

³ Deutsch. Arch. f. klin. Med., Bd. lix.

tion into the anatomic conditions causing **disturbance of swallowing and of speech** in hemiplegia. He examined 100 cases—50 right-sided, 50 left-sided—and the conclusions drawn are: First, that the center for word-forming is in Broca's convolution. Second, the center for coordination of speech is chiefly in the third right frontal convolution. Third, both centers are united by association-fibers passing through the corpora striata. Fourth, the reflex center for the pharynx and larynx is in the corpus striatum, especially on the right side, where the deglutition-center lies. Some autopsies are given to substantiate this view.

R. T. Williamson¹ reports a case in which the patient was unable to recognize objects by the **sense of touch**, although tactile sensation was apparently normal. This condition had resulted upon cerebral disease of a hemorrhagic character, and is by the author considered similar to mind-blindness and mind-deafness. He urges that in the systematic examination of cerebral cases it is necessary not only to test for the perception of tactile contact and painful impressions, but to ascertain also whether the patient can tell the nature of the object placed in the hand.

Von Kunz² reports a case of **athetosis** affecting principally the right upper extremity, with difficulties of speech and of swallowing and with convulsions. Muscular spasms were noted in the eye-muscles, which gave rise to vertigo and the subjective sensation of objects dancing before the eyes. The cramp lasted about a second, and was repeated at intervals of 2 or 3 minutes. A similar case of ocular spasm was described by Nothnagel in 1884. M. Sander³ reports a case of athetosis, with autopsy. The case was one of paralytic dementia, with right-sided paresis, showing athetosis in the right hand. The autopsy discovered in the left thalamus an area of softening. The author collected 14 cases from the literature, in 7 of which there was localized disease in the corpus striatum, 4 times in the optic thalami, twice in the pons, and once a softening that involved both the optic thalami and the corpora striata.

Ch. Féré⁴ found that on the affected side in 15 cases of **infantile cerebral hemiplegia**, in half the cases the forehead was lower, and in two-thirds of the cases the vertical measurement of the orbit was less. In four-fifths of the cases the inferior maxilla was smaller than on the sound side. The ear in these cases was found to show a flattened helix and to appear larger than on the sound side, and other projections besides Darwin's tubercle were present on the affected side.

Alexieff⁵ has been able to collect 7 or 8 published cases of **paralysis following scarlet fever**, and adds 2 of his own. The first of these, aged 4 years, suffered from nephritis and anasarca subsequent to scarlet fever, and developed left hemiplegia about 3 weeks after the eruption. The second case, a boy aged 7, showed complete paralysis of the right half of the body during a slight attack of scarlet fever. The paralysis was complete and motor aphasia was pronounced. There were symptoms of endocarditis and bronchopneumonia, with albuminuria. On postmortem examination there was found thrombosis of the left middle cerebral artery and practically complete softening of the ventricular nucleus and the posterior portion of the internal capsule.

Slawyk⁶ reports a case of **hemiplegia following diphtheria**, and notes a score of similar cases in the literature, with 13 autopsies, in which embolus was demonstrated 10 times, hemorrhage once, encephalitis once, and

¹ Brit. Med. Jour., Sept. 25, 1897.

³ Neurol. Centralbl., Apr. 1, 1897.

⁶ Jour. de Méd., July 10, 1897.

² Deutsch. med. Woch., 1897.

⁴ Nouv. Icon. de la Salpêtr., 1897.

⁵ Gaz. hebdom. de Méd. de la Chir., June 16, 1898.

thrombosis once. J. W. Brannen¹ reports the case of a woman of 19, hysterical, in rather poor health, who suffered from diphtheria of a severe type, affecting the nasopharynx. There was also albumin in the urine, but no other evidence of nephritis. About 2 weeks later she was suddenly seized with paralysis of the leg and arm on one side, accompanied by loss of speech and complete right-sided hemiplegia. This passed away in 2 hours, but on the next day recurred and persisted. The course of the hemiplegia was that usually followed, and there was evidence of its being organic and not of a hysterical character. The writer states that there are 35 cases recorded in medical literature. [While from the literature it would appear that hemiplegia after diphtheria is exceedingly rare, this is only comparatively true; and though systematic treatises on the subject of nervous diseases pay much attention to post-diphtheritic paralysis of the nervous area and only slight attention to the cerebral forms, many of these are seen in general practice without causing comment or leading to their publication.]

Sunstroke.—L. W. Sambon² gives a very important consideration of sunstroke, for which he uses the old title, *siriasis*, and makes a strong argument for its infectious character. In this relation he refers to the condition of the nerve-cells as deciphered by Van Gieson, of New York, indicating changes of toxic origin. He says *siriasis* is an acute disease characterized by hyperpyrexia, profound coma, and intense pulmonary congestion. Its mortality is exceedingly high. It has a peculiar geographic distribution, and prevails in the hot season and occasionally in an epidemic form. The symptoms of the disease, its relapses, its morbid anatomy, its peculiar geographic distribution, its epidemic outbursts, the conditions of climate and soil under which it prevails, the relative immunity to its attacks by acclimatization, all clearly point to the infectious nature of the disease. These points are then taken up seriatim, and the various theories regarding disturbance of the heat-centers and the action of heat upon the blood and the skin are dealt with.

Tumors of the Brain.—L. Bruns,³ in discussing this subject, points out that **disturbance of equilibration** characterizes tumors both of the frontal lobe and the cerebellum. In most cases general and local symptoms will establish the diagnosis. Homonymous hemianopsia is also of little value in the topical diagnosis of tumors of the brain. If, however, right homonymous hemianopsia is from the beginning associated with alexia and word-blindness, a tumor in the left occipital lobe can be inferred. The localizing symptoms of tumors in the neighborhood of the frontal convolutions, particularly in the parietal lobe, are often difficult to distinguish from those of tumors in the motor area. In such cases Bruns recommends the method of percussion introduced by Macewen, who considers anomalies of cranial percussion, tympanites, tenderness, and cracked-pot sound of great importance in general diagnosis when they are marked and extensive, and of distinct advantage as localizing conditions when they are circumscribed. In a case of difficult diagnosis between tumor of the motor area and its vicinity, definitely circumscribed changes on percussion may furnish a conclusive sign, and may be more important for localization than the cerebral symptoms themselves. Marked localized tenderness and tympanites are possible only when the tumor is at least in the neighborhood of the cortex. Gianelli⁴ believes that **hallucination** indicates irritation of the corresponding cortical sensory center. The more prominent the psychical disorders, such as torpor, intellectual arrest, and weak memory, the more likely the growth is to be found in the prefrontal lobe. Tumors in other parts of the brain, as a rule,

¹ Med. Rec., July 30, 1898.

² Brit. Med. Jour., Mar. 19, 1898.

³ Wien. klin. Rundschau, No. 46, 1897.

⁴ Il Policlinico, July 15, 1897.

only give rise to psychical symptoms at a late period. He asserts that tumors of the corpus callosum are always accompanied by cortical disturbance; but cases are on record that disprove this. Modifications of feelings and emotions give no index as to the location of cerebral growths. He thinks that cases of tumor manifesting themselves clinically as progressive paralysis are probably situated in the frontal lobe. The same is true when ideas of grandeur appear in the course of the development of cerebral growths. The nature of the growth seems to have no influence on the psychoses. In 77 cases tumor in the frontal lobe was accompanied by mental disturbance. In 20 cases of tumor in the frontal lobe there were no pronounced psychical symptoms. Obici and Bollici¹ report a case in which sarcoma of the brain was **localized by the X-rays** after death. The tumor presented a comparatively dark, well-defined area, and the accuracy of the evidence was determined by dissection. They made a number of experiments upon the heads of cadavers by first taking skiagraphs in the natural state and then simulating pathologic conditions by the introduction of tumors into the brain, by the formation of artificial cysts, etc., and in many instances were able to demonstrate the location of the artefact by the skiagraphic method. [In a case now under observation, presenting all the classic symptoms of tumor of the cerebellum, the X-rays indicate a mass in the corresponding location, but the skiagraph has not yet been proved by operation or autopsy.]

Paoli and Mori² report an extensive series of observations on the value of **percussion** in eliciting information regarding conditions within the cranial cavity. They first made elaborate observations upon the normal skull, and insist upon the necessity of shaving the head when the hair is thick. Percussion was done directly with the finger. They find that a dull note is found only in very limited areas, the rule being a high degree of resonance with well-marked difference in various portions of the head, and that the results vary with age, sex, and the density of the skull-cap. In rickets the note is more resonant, and sometimes a cracked-pot sound can be perceived. In women there is more resonance than in men, the percussion-note resembling that in childhood, and the cracked-pot sound is uncommon. The areas giving a dull note are the parts over the frontal sinuses and on the mastoid processes, especially in children. Applying these findings to morbid conditions, they have been able to detect marked dulness over portions of the skull corresponding to a fracture, in which subsequent trephining discovered thickening of the dura with hemorrhagic infiltration in the form of a hematoma corresponding exactly to the area of dulness. In several other cases of fracture somewhat similar findings were obtained. In one case where the use of the right hand and arm had been lost and aphasia was present, dulness was detected over the left side of the head, though the wound leading to the paralysis was on the right occipital bone. The patient improved and the dulness receded.

J. Ursini³ gives his observations upon **changes in the spinal cord** in 4 cases of brain-tumor. The alterations were practically confined to the posterior tracts, and in the absence of increased pressure from an undue amount of cerebrospinal fluid he believes they must be attributed to an intoxication-process.

A. Jokoloff⁴ describes a case of **gumma of the hypophysis** occurring in a woman, 44 years of age, who during life presented dilatation of the right pupil as the only cerebral symptom. The tumor was as large as a walnut and cheesy in consistency. The diagnosis of syphilis was fixed by the histologic

¹ Rivista di Patolog. e Ment., Oct., 1897.

³ Deutsch. Zeit. f. Nervenhi., 1897.

² Il Policlinico, Feb. 15, 1898.

⁴ Virchow's Archiv, Band xliii.

character of the growth and gummy nodes in the liver. The meninges were free. This is the third instance of 'gumma of the hypophysis, the two former being reported by Weigert and Barbucci. [No acromegalic symptoms were reported.]

Hydrocephalus.—Concetti,¹ of Rome, finds **hydrocephalic fluid** sterile, faintly alkaline, and of a specific gravity of 1005 to 1010. It is not toxic upon being injected into animals. It has probably the same chemie composition as physiologic cerebrospinal fluid, and is not an exudate or transudate, but a true secretion. The author finds that the fluid has an agglutinative effect upon staphylococci, checking their growth, and that the movements of *Bacterium coli* are rendered sluggish. With inoculated animals he found that death occurred less quickly than in control animals.

J. A. Sutherland, before the Clinical Society of London, read for himself and Cheyne² the notes of a case of an infant, 6 months old, who was suffering from congenital hydrocephalus and syphilis. No improvement having followed 3 months' treatment, the head steadily increasing, with gaping fontanels, an **operation** was done. A small opening was made in the dura, opposite the left lower angle of the anterior fontanel, and a catgut drain was introduced into the lateral ventricle, the other extremity passing between the brain and dura for the distance of an inch. A small quantity of ventricular fluid escaped. The dura was completely closed, the scalp sutured, and an ordinary dressing employed. On the fifth day the wound was entirely healed. From the day of operation there was steady and uniform decrease in the size of the head, with no bad symptoms, and within a few weeks the space between the cranial bones was entirely obliterated, although the posterior fontanel measured 9 in. in its diameter at the time of operation. The infant died 3 months after operation, with basilar meningitis. At the necropsy the membranes at the base were thickened and adherent, and a considerable quantity of subdural fluid was present. A small cystic brain showed no distention of the ventricles. [See, also, the cases reported in YEAR-BOOK for 1898, in which subcutaneous drainage was of benefit.]

Hereditary Chorea.—Lannois and Paviot³ reported before the Congress of French Alienists and Neurologists 2 cases of this disease, with autopsies. In addition to the meningeal thickening, pachymeningitis, and recent hematomata, the authors called particular attention to the cerebral atrophy, which was extremely pronounced. The entire encephalon weighed in one case 950 g. and in the other case 980 g. Microscopically the essential element consisted in the infiltration of small round cells in the cortical layers and in the white substance subjacent, enveloping the pyramidal cells by invasion of the lymphatic sheath. The cord was slightly affected in the descending columns, in the anterolateral region, and in the direct cerebellar tracts.

DISEASES OF THE SPINAL MENINGES AND SPINAL NERVES.

Multiple Neuritis.—E. E. Laslett and W. B. Warrington⁴ give a detailed history and postmortem examination in a case of lead-paralysis. They found, in addition to the usual changes in the muscles and peripheral nerves, that **cord-changes** had also taken place. The nuclei of the anterior-horn cells were found displaced eccentrically and the Nissl bodies were dispersed throughout the cell in the form of fine powder, with sometimes an actual disappearance of the blue coloring-matter in the central mass of the cell, the result of

¹ Wien. klin. Woch., No. 42, 1897.

² Arch. de Neurol., Oct., 1897.

³ Brit. Med. Jour., Mar. 19, 1898.

⁴ Brain, 1898.

chromatolysis. The proportion of altered cells in this case was about 1 in 4, equally distributed on both sides of the cord. Philip Meierowitz¹ reports a case of multiple neuritis **from arsenic** in a school-girl, 13 years of age, following the administration of Fowler's solution for chorea. She had taken 4 oz. of Fowler's solution during a period of 7 weeks, beginning with 5-drop doses 3 times a day. The dose was increased 1 drop daily until she was taking 15 drops. She then began to vomit and there developed some edema of the eyelids. The dose was reduced to 10 drops, and continued up to a few days prior to the author's examination, when only 5 drops were given. It was the fourth or fifth attack of St. Vitus's dance. She had in these previous attacks been subjected to arsenical treatment. A week and a half before coming under observation she had complained of stiffness in the knees, and a few days later of pins and needles in the hands and feet. The legs became weak and there was severe pain in the lower extremities. Friction of the muscles was extremely painful. Walking was interfered with, and she was confined to her chair during the entire week previous to her visit to the clinic. Pains also appeared in the upper extremities. There were atrophy of the muscles in the limbs, a corresponding weakness, wrist- and foot-drop, and other undoubted indications of the condition in question.

H. M. Thomas,² in a clinical lecture on **recurrent polyneuritis**, describes a case of this rather rare affection in a patient, 28 years old, of good family and personal history. His occupation was that of office-work, without contact with lead or poisons. The first attack began in June, 1892, preceded by chronic indigestion. In June, 1893, he had a second attack quite similar to the first, but recovered from it by the following November. In June, 1895, the symptoms recurred, and again he recovered by November. In June, 1896, he had a fourth attack, and was well in October. June, 1897, his legs began again to swell and feel numb and weak. This attack, as in all the others, appeared first in the left foot and then in the right, the symptoms slowly increasing, though he kept at his work. Walking became more difficult, and in October he was compelled to drive to his place of business. In November he found he was unsteady on his feet when standing, and fell on several occasions. He grew considerably worse and his hands were affected and clumsy. After being in bed for about 3 weeks he began to get about and slowly improved. The causation of the attacks is obscure, but the author attaches some weight to the history of chronic indigestion. He then makes reference to the literature of the subject, mentioning the first 2 cases reported by Mary Sherwood from the Zurich clinic, and others by Ross, Dreschfeld, Targowla, Klumpke, and Osler, and concludes: 1. That there are patients who show a marked tendency to the occurrence of repeated attacks of multiple neuritis. 2. That we do not at present know how the poisons which may cause the neuritis differ from each other in their liability to cause recurrences, except in the case of lead, which seems particularly prone to give rise to recurrent attacks of paralysis, at times even when there has been no reexposure to the poison. 3. That we are not able to state upon what the repeated attacks of multiple neuritis depend—whether they are simply the manifestations of an unusual individual predisposition of the nerves to become diseased, or whether the first attack of neuritis itself leaves the nerves more liable to the second attack.

G. S. Woodhead³ gives statistics of 7832 cases of certified diphtheria which have come under notice through the Research Laboratories of the Royal Col-

¹ Med. Rec., Dec. 25, 1897.

² Phila. Med. Jour., May 14, 1898.

³ Brit. Med. Jour., Sept. 3, 1898.

lege of Physicians and Surgeons. Of this number, 1362 suffered from **diphtheric paralysis** of a more or less marked kind, and of these, 1096 had been treated with antitoxin. He refers to the cases collected by Miller, 494 in number, in which the primary paralysis appeared in the palate 185 times, as strabismus 197 times, as paralysis of other muscles 102 times, as cardiac paralysis 102 times. The bulk of the palatal palsies occurred between the fifth and fifty-fifth days; none before the fourth day. The oculomotor paralyses mainly occurred between the fourth and seventeenth days; none before the fourth day. Primary paralysis of other parts occurred between the tenth and fourteenth days mainly, and none before the tenth day. The majority of the cardiac palsies occurred between the fifth and tenth days, but have occurred as early as the second day, and in 2 cases as late as the fifty-fourth day, ending fatally. One case recovered after paralysis of this character on the fifty-ninth day.

John J. Thomas¹ completes his study of the changes in the nervous system due to the action of diphtheric poison, and reaches the following conclusions: 1. A marked parenchymatous degeneration of the peripheral nerves, sometimes accompanied by an interstitial process, and hyperemia and hemorrhages. 2. Acute diffuse parenchymatous degenerations of the nerve-fibers of the cord and brain. 3. No changes, or but slight ones, in the nerve-cells. 4. Acute parenchymatous and interstitial changes in the muscles, especially the heart-muscle. 5. Occasional hyperemia, or infiltration, or hemorrhage in the brain or cord, in rare cases severe enough to produce permanent troubles, such as the cases of multiple sclerosis and of hemiplegia which have been observed. 6. The probability that the cases of sudden death from heart-failure in diphtheria, during the disease or convalescence, are due to the effects of the toxic substances produced in the disease upon the nerve-structures of the heart.

E. D. Bondurant² gives a detailed account of an **epidemic of multiple neuritis** in the insane asylum at Tuscaloosa, Alabama. At that time the asylum contained about 1200 patients. There were 71 cases of beri-beri, of which 21 were fatal. There were in the hospital at the same time 80 epileptics, who furnished 22 cases of beri-beri. White patients seemed more subject to the disease than negroes. After detailing a number of cases, some of which are photographed, he discusses the origin of the affection, and is inclined to trace it to the water-supply, which furnished opportunity for malarial poisoning. At the same time malarial disturbances were more common in the asylum and in Tuscaloosa, the water being from a somewhat similar source. But he does not think the cases were those of malarial neuritis. In a number of blood-examinations for the plasmodium the results were negative. Taking the situation in review, he concludes: "First, that the dietary and sanitary condition of the institution was not such as to predispose to the occurrence of beri-beri. Second, that the feeble-minded and degenerate insane are especially susceptible to the disease. Third, that the sedentary life led by a portion of the patients was a further predisposing cause. Fourth, that the exciting cause of the disease developed in the recently dammed-up river, which also favored the growth of the malarial germ, and was transmitted in miasmatic exhalations or in the water used for drinking." A further report on the postmortem appearances is promised. In at least 1 case there was found degenerative change in the motor cells of the anterior gray horns of the cord. In no case was there redness, hemorrhage, or gross inflammatory changes of the nerve-trunks or degenerative change in the filaments themselves. The muscles showed the usual

¹ Boston M. and S. Jour., Feb. 10, 1898.

² N. Y. Med. Jour., Nov. 20, 1897.

atrophic changes commonly found, including the heart-muscle, in those cases in which the vagus participated in the lesion.

Hyreta¹ refers to 52 cases of **beri-beri** in nursing-infants, 42 of which recovered, 5 died, and the result was unknown in the remaining 5 cases. The recovered cases were simply supplied with cow's milk and artificial foods or a wet-nurse; the disease was immediately arrested and improvement rapidly took place. Undoubtedly the disease is communicated to the infants in these cases through the mother's milk, and consists of an intoxication; otherwise its immediate improvement would not occur upon weaning. This serves to throw important light upon the character of the process in all cases.

N. G. Munroe² reports a case of symmetrical **gangrene** in a native of Java, who was incapacitated by beri-beri. A thin, black line crossed the tips of the toes, symmetric in both feet, and the process slowly extended in the dry form. A line of demarcation finally formed on both legs, about 2 in. above the ankles, and led to amputation at the point of election on both sides.

Neurofibromatosis.—Feindel³ describes the pigmentation, mental phenomena, and changes of motility and sensation in this condition. The tumors are both cutaneous and connected to nerves, and vary greatly in number and size. They are of variable consistency and resemble mollusca. Usually the face is spared, also the palms of the hands, soles of the feet, and the genitals. Often they are distributed along a nerve-trunk like a string of beads. The pigmentation is frequently in small spots, but large colored areas may be encountered. The patients often have loss of memory and show some difficulty in comprehension. The motor difficulties show themselves in slowness of movement, tremors, and epileptiform seizures. The sensory disorders are vague anesthesia and paresthesia, with painful cramps. The disease is sometimes congenital, but may appear in adult life or advanced age. It should always be looked upon, however, as congenital in origin, seeming to depend upon some malformation of the skin and nerves. It may be hereditary and show a family distribution. Many years of latency in some cases seem to indicate that a secondary influence may act as an inciting cause. Thus traumatism, arsenical poisoning, or some specific infection, such as measles and scarlet fever, have apparently led to its development. It may remain stationary for a long time; sometimes it is slowly progressive, and the majority of patients seem to die in a condition of extreme marasmus. Some of the tumors, it is believed, may take on a malignant character, and this, of course, affects the prognosis.

Meralgia.—A. de Luzenberger⁴ reports a case of this localized sensory disturbance in the outer surface of the thigh, corresponding to the type first described by Barnhardt, and following acute tonsillitis. The peculiarity in the case consists in the fact that 8 days before the inflammation of the throat a slight bruise on the outer surface of the thigh had resulted from striking against a piece of furniture, and seems to have located the pernicious action of some toxic substance.

Metatarsalgia.—Royal Whitman,⁵ after a very thorough discussion of the literature of the subject of Morton's tarsalgia, gives his own views of the nature of the disorder, and concludes that Morton's painful affection of the feet is due to the abnormal relation of the metatarsophalangeal joints to one another, combined with pressure, and that this relation is caused by the depression of the transverse anterior metatarsal arch, or one of the bones of which it is composed. This is usually sequential to a general weakness of the foot, and

¹ Centrallbl. f. klin. Med., Apr. 23, 1898.

² Brit. Med. Jour., Sept. 11, 1897.

³ Jour. de Méd., Mar. 10, 1897.

⁴ Neurol. Centrallbl., 1896.

⁵ Med. Rec., Aug. 6, 1898.

much of the discomfort is due to pressure on the depressed bone from beneath. Occasionally it occurs without deformity, and is then due to lateral pressure upon an overriding fifth metatarsal bone, caused by abnormal laxity of the ligaments. An improper shoe is the most constant of the general causes predisposing to the deformity of the foot. He states that he has never found it necessary to perform an osteal resection, but in the treatment advocates a shoe of improved pattern, with a low heel, wide, thick sole, well-fitting arch, and with abundant room for the toes. The inner edge of the sole may be made thicker if there is a tendency to valgus; but the main point in the treatment is to support the anterior arch, and this is accomplished by the use of the steel splint or form, which may be built into the sole of the shoe. He claims that a cure may be attained by supporting the arch, avoiding exciting causes, correcting abnormalities of structure, and strengthening the weakened foot by exercises.

Neuritis Caused by Surgical Operations.—H. T. Pershing¹ refers to the number of cases of painful localized palsy he has met after recovery from anesthesia employed for surgical purposes. Usually these accidents are due to long-continued pressure during anesthesia, either through force for maintaining the patient in position, by the dragging of the limbs over the edge of the table, or by the continued elevation of the arm over the head, as in amputation of the breast. He suggests that for the prevention of this accident "the patient's arms should not be allowed to hang down, and care should be taken that during operation the weight of the body is as evenly distributed as possible. Keeping the patient in any constrained position should be avoided when not absolutely necessary, and the use of any mechanical contrivance for maintaining a desired position should be with due care to prevent nerves from being stretched or pressed upon."

Section of the Posterior Spinal Roots.—A. von Korniloff,² in an article entitled "Modifications of Motor Function through Disturbance of Sensation," reviews experimental work by himself and others upon animals and certain clinical cases in which the posterior roots were divided, and reaches a conclusion which he expresses as follows: "No loss of reflex sensibility. Motility is less even when the entire motor apparatus from the psychomotor centers to the muscle-ends is intact. No motility without sensibility." For instance, in dogs the author found that section of 4 or 5 of the lumbar sensory roots produced loss of power in the corresponding extremity that could not be accounted for by the seriousness of the operation, and was due entirely to the division of the roots, as shown upon subsequent section, when the anterior spinal apparatus was found intact. [The importance of this consideration applies to the present tendency to operate upon the posterior spinal roots in neuralgias.]

DISEASES OF THE SPINAL CORD.

Spinal Hemorrhage.—William Bain³ reports the case of a housemaid, 18 years of age, who, after experiencing some difficulty and dizziness one day, the next morning, shortly after rising and going to stool, felt numb all over and had difficulty in walking, requiring assistance to get back to bed. Shortly afterward she complained of difficulty in breathing, pain in the back of the neck, loss of motion and numbness in the upper and lower extremities. The pulse was 52, and in a few minutes she suddenly died. Postmortem examination showed normal conditions except in the spinal canal, where, opposite

¹ Med. News, Sept. 11, 1897.

² Deutsch. f. Nervenhe., Band xii., Heft 3.

³ Brit. Med. Jour., Aug. 21, 1897.

the third cervical spine, there was an extradural clot, and the dura was blood-stained. The clot was small, and extended from the second to the third cervical vertebra, compressing the cord.

Cushing¹ reports a case of **hematomyelia** from gunshot-wound of the cervical spine. The bullet entered the right side of the neck, at the level of the cricoid, and lodged in the centrum of the sixth cervical vertebra, producing one type of the so-called Brown-Séquard paralysis. Upon entrance to the hospital the patient was suffering from pains of the pins-and-needles character, especially in the arms; but no radiating pains were described. Consciousness was undisturbed. Motor palsy was complete on the right side, below the level of the fifth segment. On the left side there was paralysis of the arm up to the same segment-level—namely, for the deltoid, biceps, and supinator longus muscles. There was marked elevation of surface-temperature, considerable hyperalgesia, and a diminution of reflexes on the paralyzed side. Sphincteric control was lost. Improvement took place, and the motor paralysis gradually disappeared. Paralysis of the small muscles of the right hand alone remained, representing a destruction of the ganglion-cells at the site of the lesion. The X-rays showed the position of the ball, and indicated that the spinal canal had not been entered. The lesion, therefore, was presumably an intramedullary hemorrhage.

Compression of the Spinal Cord in Pott's Disease.—W. G. Spiller² reports 2 cases of compression of the spinal cord in Pott's disease, with microscopic examinations of the cord at the point of injury. The pressure was brought about mainly by a pachymeningitis, but in 1 case by bony compression due to a displaced vertebra, contrary to the dictum of some orthopedic writers. Below the compressed areas the gray matter gradually resumed its normal appearance. The crossed pyramidal, Gowers's, and the direct cerebellar tracts were, however, greatly degenerated, and the direct pyramidal was also involved. The central canal was enlarged both above and below the lesion, and the lumbar cord was surrounded by much gliar tissue, resembling the condition seen in syringomyelia.

Spinal Tumor.—J. T. Eskridge³ reports a case of intradural spinal tumor extending through the foramen magnum, almost completely destroying it, at the third cervical segment. The tumor turned out to be a spindle-cell sarcoma, and could have been surgically removed had the patient's condition justified operation. Among the interesting points developed by the case and postmortem it appeared that the greatest damage to the cord was on the side opposite the tumor. The third cervical segment was almost completely destroyed, while the first and second were greatly damaged. From the symptoms presented by the case the author believes that the first and second cervical segments supplied the tactile sense to the posterior portion of the scalp, a narrow strip on the posterior portion of the neck as far as the fourth spinal process, and to the face in front and below each ear. J. T. Eskridge and J. A. Rogers⁴ report a case of tumor of the spine, producing compression-myelitis, in which operation was followed by death on the ninth day. The patient was a male Russian Hebrew, 28 years of age, with good family-history and no bad habits. He had not encountered any injury. In October, 1896, the patient rode 36 miles over rough mountain-roads in a cold rain, and the next morning noticed pain reaching from the spine around the front of the chest. The pain in the spine was a few inches above the lower angle of the scapula, just below the axilla, and in front below the right nipple. During the

¹ Bull. Johns Hopkins Hosp., Aug.-Sept., 1897.

² Ibid., June, 1898.

³ Med. News, Sept. 25, 1897.

⁴ Phila. Med. Jour., Feb. 19, 1898.

next 4 months pain was limited to this region and continued to increase. Bending the back in any direction was painful. On Feb. 25, 1897, while attempting to walk across the room without assistance, he felt a severe pain on the left side under the scapula, a few inches above its lower angle, and since that time suffered from pains on both sides at about this level. On March 17 disturbance of sensation appeared in the lower extremities, especially on the inner side of the legs and thighs, and subsequently the legs became weak, he was unable to empty the bladder, and a day later the legs were unmanageable. Examination March 25 found absolute paralysis of the foot-, leg-, and head-muscles. The abdominal muscles seemed to be completely paralyzed. No control of the bladder or bowel. The hand-, arm-, and shoulder-muscles were of normal strength; the fifth dorsal spine was very sensitive; the spinal column in this region was the seat of constant pain, which radiated around the chest on either side. Right knee-jerk was increased and the left greatly exaggerated. Ankle-clonus of the right side was slight; of the left, decided and continuous. Tactile sensation was lessened over the soles of the feet and the fourth intercostal space. Temperature-sensation was completely lost on the soles of the feet and blunted up to the nipple-line. A band-like area about an inch in width extended around the chest just above the nipple-line, and was hypersensitive to both cold and warm substances. Spinal sensation normal, except left-sided deafness, which had been present since childhood. April 13 operation was done, and a tumor-mass found at the level of the fourth or fifth vertebra, involving the bodies of these vertebrae and the articular processes, and pushing the cord laterally to the left. It was extradural, and of such a size and position as to make its removal impossible. The patient suffered no pain subsequent to the operation, but died on the ninth day, from exhaustion. No autopsy was allowed.

Spinal Puncture.—Noelke¹ reports a number of cases from Quinke's clinic in which this operation was performed, with distinct modification of the intracranial pressure. He also observed a striking difference in the amount of albumin in the spinal and cranial fluids, which may possibly be normal. Wilms² has practised lumbar puncture 30 times in 23 cases, and has found Schleich's local anesthetic infiltration of service in carrying out the operation. In 1 out of 4 cases of cerebrospinal meningitis the diagnosis was made by means of the puncture. In 2 others the meningococcus was found. In the remaining case improvement followed each of two punctures, and the patient ultimately recovered; but the first 3 died. In 5 fatal cases of tuberculous meningitis puncture was practised 6 times, but the tubercle-bacillus was only found once. In this case slight improvement followed the puncture, but it was only temporary. In 3 cases of pseudomeningitis and infective processes 6 punctures were done; 1 case of sepsis, 1 of typhoid fever, 1 of pneumonia. The negative result was of value in diagnosis. One case of uremia was punctured without benefit. In a case of syphilitic meningitis clear fluid was obtained, and the same result was noted in another case of cerebral syphilis with spinal meningitis. Puncture was also practised in a case of pronounced chronic hydrocephalus and in a case of delirium tremens. In a case of chlorosis with violent headache there was no increased pressure. In a doubtful case of intracranial syphilis the negative result of the puncture proved of diagnostic help. In 5 out of 6 punctures in cerebral meningitis the fluid was turbid; in 1 out of 6 punctures in tuberculous meningitis the fluid was turbid. Albumin in the fluid was most marked in the inflammatory affections. Sugar was found in the case of hydrocephalus. Seegelken³ reports a case of lead-

¹ Deutsch. med. Woch., No. 39, 1897. ² Münch. med. Woch., Jan. 19, 1897. ³ Ibid., 1896.

encephalopathia in which coma and convulsions were relieved by lumbar puncture, with permanent benefit. Thiele¹ relates his experience in von Leyden's clinic with this procedure, and concludes that spinal puncture is a valuable extension of the means of diagnosis, and is of some therapeutic value in cases of serous and seropurulent meningitis, as well as in the cerebral disturbances of chlorosis.

Landry's Paralysis.—F. Piccinino² reports the case of a soldier, 23 years of age, who presented fever, chills, abdominal pains, and diarrhea, lasting 3 or 4 days, and then developed a weakness in the upper extremities unmarked by changes of sensibility or of the reflexes. The weakness became complete paralysis and invaded the lower extremities. Finally swallowing was affected, the patellar reflex was lost, and the patient died from respiratory failure. Upon examination by the Nissl method, marked changes were found in the cells of the anterior horn of the dorsal cord and almost none in the lumbar cord. Bacteriologically an intracellular micrococcus closely resembling that of Fränkel was found in the pericellular and perivascular spaces. Charles K. Mills and W. G. Spiller³ report a case of Landry's paralysis, with the postmortem findings. From a study of the literature and examination of this particular case they reach the following conclusions: 1. That there is a form of ascending, flaccid paralysis, with little disturbance of sensation, with normal electric reactions, and without involvement of the sphincters, and that this is of rapid course, usually terminating in death. 2. Other cases differ from this type by one or more atypical signs, and transitional forms occur which make the diagnosis between Landry's paralysis, polyneuritis, and myelitis difficult. 3. It is possible that in some cases no lesions exist; but many of the reports of such cases date from a time when the methods of examination were very imperfect; or it may be that in these cases the lesions are in an early stage of development, the patient succumbing to toxemia before demonstrable changes in the nervous system take place. 4. That Landry's paralysis may be due to myelitis alone. 5. In Landry's paralysis polyneuritis may be present; but changes in the cell-bodies of the anterior horns will also usually be found in such cases by Nissl's stain; and it is sometimes difficult to say whether the cellular changes are primary or secondary. 6. It is probable, in some cases at least, that the entire peripheral motor neuron is attacked at the same time by the poison of the disease. J. J. Thomas⁴ reports 2 cases of Landry's paralysis that ran a typical course and were submitted to very careful autopsical investigation. From the first case the following summary and diagnosis was reached: 1. Acute inflammatory exudation of the anterior horns of the gray matter, with parenchymatous degeneration of the nerve-cells and processes. 2. Infiltration of perivascular lymph-spaces and dilatation of vessels of the anterior horns. 3. Moderate infiltration about the vessels of the posterior horns and of the white matter of the cord. 4. Slight parenchymatous degeneration of the nerve-fibers of the white matter of the cord. 5. Slight degeneration of the posterior nerve-roots and marked degeneration of the anterior nerve-roots. 6. Parenchymatous degeneration and perivascular infiltration of the peripheral nerves. 7. Absence of microorganisms in sections and cultures. *Anatomic Diagnosis.*—Bronchopneumonia of left lung; chronic diffuse nephritis; arteriosclerosis of aorta; myoma of uterus; acute anterior poliomyelitis.

The second case is summarized as follows: Microscopic examination showed: 1. Parenchymatous degeneration of the peripheral nerves present

¹ Deutsch. med. Woch., June 10, 1897.

³ Jour. Ment. and Nerv. Dis., June, 1898.

² Anal. di Nevrologia, 1897.

⁴ Am. Jour. Med. Sci., Aug., 1898.

to a greater or less extent in all the nerves examined. 2. Degenerative changes in the large ganglion-cells of the anterior horns of the cord, with destruction and fragmentation of the protoplasmic granules and loss of the nuclei of the cells. 3. The nerve-cells of other portions of the gray matter of the cord, medulla, brain, and spinal ganglia unchanged. 4. No change of white matter of the cord. 5. Absence of microorganisms in the tissues. *Anatomic Diagnosis.*—Bronchopneumonia and hemorrhage of the lungs; enlargement of the spleen; congestion of the kidneys; congestion of the brain and cord; parenchymatous degeneration of peripheral nerves and motor cells of cord. After taking up the literature of the pathologic findings in this comparatively rare disease, the author deals with the etiology as follows: "Analysis of the reported cases as to the cause shows that in a great many none could be ascribed; nevertheless, in a considerable number of cases acute ascending paralysis followed closely upon some infectious disease, such as small-pox, diphtheria, or typhoid. The presence of an enlarged spleen and of swelling of the mesenteric lymph-glands, which is so often noted in the autopsies, confirms this view. It has been said that we may expect to find some microorganisms present in the nervous structures; but more often it is probable that the microorganisms producing the poison will be found in some other part of the body. Inasmuch as nerve-cells react in much the same way to various poisons, further research will probably show that in these cases microorganisms are not always present, but that the intoxication may be produced through faulty metabolism or by the absorption of poisons from without. That toxic substances may act in a selective manner, affecting only the motor neurons, is difficult to explain; although we are not without other instances of the same action, for example, the almost pure motor trouble in lead-paralysis, which, in this case, as is well known, has a special predilection for the motor nerves and for those going to the extensor muscles of the forearm."

L. Krewer¹ has had an opportunity to examine 4 cases of Landry's paralysis, 3 of which were fatal and afforded an opportunity for examination of the nervous apparatus. He concludes as follows: 1. Landry's paralysis is the second and third stages of a chronic multiple neuritis which invades the spinal cord and, by an upward course, the ventricles of the medulla oblongata, and so leads to a fatal termination. 2. For the development of Landry's paralysis upon a previous polyneuritis it is necessary for a new factor to be implanted, which is usually some infectious disease. 3. Clinically Landry's paralysis is essentially of progressive course and paralytic character. 4. Anatomically and pathologically Landry's paralysis is characterized as a subacute chronic polyneuritis and an acute diffuse myelitis. [The author's conclusions are dominated by the fact that the majority of patients were alcoholics, and the multiple neuritis which he presumes to be the first stage of Landry's paralysis was attributable to their alcoholic habits. It certainly is not proved that all cases of Landry's paralysis have as an initial stage a multiple neuritis.]

Hirtz and Lesne² report a case of Landry's paralysis which ran a typical clinical course. At the autopsy no appreciable lesion was found in the peripheral nerves. The spinal meninges were congested, and there was congestion of the vessels of the white substance and of the gray substance of the cord, especially in the anterior horns. The perivascular sheaths were filled with round lymphatic elements; there was no degeneration of the white substance; the posterior horns were intact; the cells of the anterior horns were changed, many had disappeared, others were hypertrophied, and some atrophied. The cellular bodies were clear; some nuclei were swollen and exhibited

¹ Zeit. f. klin. Med., Band xxxii.

² Presse méd., June 12, 1897.

stains poorly or not at all; frequently they were displaced toward the periphery of the cell. Lesions were most pronounced in the lumbar region; diminishing above and disappearing at the cervical enlargement. The spinal roots appeared normal.

Poliomyelitis.—J. Madison Taylor¹ reports a small epidemic of this disease, embracing 7 cases, occurring at Cherryfield, Maine.

Larat,² in the **treatment** of infantile paralysis, gives preponderating importance to the use of electricity, which should be employed in cases of all grades of severity. He insists that the faradic current is not only useless, but harmful, and increases the tendency to muscular atrophy. He employs the continuous current, in the following manner: A large electrode, the size of the palm of the hand, made of tin, covered with chamois-leather and moistened with tepid water, is placed over the cervicodorsal region in the case of the upper extremities being paralyzed, over the dorsolumbar region when the legs are affected. This is the positive pole. The negative consists of a basin of tepid water, in which the hand or foot, as the case may be, is immersed sufficiently to cover the wrist or ankle. Into this the negative pole is dropped and a current of 8 or 10 ma. is passed for 10 minutes. Owing to the large surface there is no pain, a point of importance in children. After 10 minutes the current is interrupted and reversed; but these interruptions do not exceed 100 at each *séance*. They should be made slowly, and later on may be increased in number. Eulenburg³ discusses **transplantation of tendons** for correction of the paralytic conditions of this disease. These transplantations in the lower extremities have been adopted by various surgeons, and Eulenburg adopted the plan in spastic paraplegia in a child of 3 years, apparently a cerebral case. A portion of the Achilles tendon was attached to the united tendons of the peronei, and after a fortnight faradic stimulation of the tibial nerve caused raising of the outer side of the foot. A similar operation was done on the opposite limb. The spasm disappeared, and the child could place its foot on the ground with readiness.

Henry Lamy⁴ induced degeneration in the spinal cord by an infusion of aseptic matter, usually the seeds of lycopodium, by way of the anterior spinal arteries. The emboli caused necrotic infarcts in the substance of the cord analogous to those produced in other organs. They were principally situated in the gray substance. He also found foci in the white substance, and these sometimes attained large proportions. The picture presented was strongly suggestive of the lesions found in anterior poliomyelitis and syphilitic myelitis. The author believes that the mechanism of infectious myelitis is the deposition of infectious material through arterial channels.

Syringomyelia.—Pospeloff⁵ reports a case in which **erythromelalgia** was present, and inclines to the belief that the latter condition is also of central origin. Schultze⁶ asserts that syringomyelia has no uniform **causation**: 1. A certain percentage of cases occur as anomalies of development. 2. Independently of that or associated with it, the disease may arise from a centrally situated glioma as a primary gliosis with cavity. 3. Traumatism leading to hemorrhages, with subsequent softening of the hemorrhagic areas, may be an etiologic factor. 4. Inflammatory processes and the narrowing and closing of blood-vessels require further investigation. 5. Pressure plays a small part, except in the production of hydromyelia. 6. Infection may play a part in the development of the disease, but Schultze does not believe that the disease occurs in

¹ Phila. Med. Jour., Jan. 29, 1898.

² Deutsch. med. Woch., Apr. 27, 1898.

³ Presse méd., Nov. 10, 1897.

⁴ Jour. de Méd., July 25, 1897.

⁵ Arch. de Physiol., 1897.

⁶ Berlin. klin. Woch., Oct. 4, 1897.

leprosy. 7. An association between syringomyelia and ascending neuritis is not sufficiently supported by facts.

Saxer,¹ in an admirable and exhaustive article, takes up particularly the subject of the **etiology** of this disease. A summary of his work, as furnished in the pathologic department of the *Am. Jour. Med. Sci.* for 1898, is as follows: 1. There is a tendency to separate the various forms of cavity-formation in the cord, as sharply as possible, on an etiologic basis. 2. Hoffmann would limit the term syringomyelia to cases of central gliosis. 3. The connection between most cases of syringomyelia and anomalies of development of the central canal of the cord is now generally accepted. 4. The terms glioma (a malignant new growth) and gliosis (a pathologic growth of neuroglia-tissue which shows none of the properties of a new growth) are clearly differentiated. The indefinite term gliomatosis should be given up. 5. According to Weigert, the cavity in syringomyelia is primary, and never due to the breaking down of a central gliosis.

Changes in the Spinal Cord due to Pernicious Anemia.—

Lenoble² takes up the subject of pernicious anemia, in a man of 26, following a violent traumatism to the right breast. He presented vertigo, intense headache, hyperesthesia, fibrillary contraction of certain muscles, exaggeration of reflexes and ankle-clonus. Death occurred at the end of 5 months. At the autopsy small hemorrhagic foci, proliferation of the neuroglia, and partial absence of the myelin was found in the cord. The lesions were diffuse and interstitial. G. von Voss³ has experimentally investigated the relation of spinal changes to pernicious anemia. He produced artificial anemia in animals by means of pyrocin and other substances, and kept the animals alive for a considerable time up to 24 weeks, but obtained no changes in the spinal cord. He believes, therefore, that in pernicious anemia the degenerative changes in the cord are the result of hitherto-undiscovered chemical agents, and suggests a more thorough investigation of metabolism in this disease.

Tabes Dorsalis.—Klippel⁴ finds that **alterations of taste and smell** in tabetics are of common occurrence and manifest themselves at an early date, as do other sensory symptoms, such as numbness, paresthesia, and pains. They may, however, be late features. Loss of smell and taste is commonly overlooked by the patient absorbed in more prominent symptoms; and some tabetics are absolutely devoid of the sense of smell without being aware of it. In certain instances these senses merely show perversion in an intermittent form, somewhat resembling crises. For a day or so at a time the patient may complain of an earthy, metallic, or bitter taste, or of sour smells and unpleasant odors.

Letulle⁵ records an instance of a **perforating ulcer of the mouth** in a tabetic 51 years of age. On the right side of the upper jaw there was a cavity involving the alveolar border and the hard palate, opening like a cone into the middle meatus of the nose. The mucous membrane lining it was pale and thickened, and comparatively insensitive. Baudet has collected 8 cases, in tabetic subjects mainly. The condition may be unilateral or bilateral, but always occurs in the same situation. It is probably, according to Gallippe, the result of alveolar pyorrhea aggravated by the atrophic disturbances of tabes.

Hirschberg⁶ furnishes an article on the **involuntary movements** which occur in tabes. These are not sufficiently described in the majority of works on the subject, but consist in involuntary movements occurring during rest;

¹ Centralbl. f. allg. Path., 1898.

² Deutsch. Arch. f. klin. Med., vol. lviii.

³ Presse méd., Apr. 2, 1898.

⁴ Jour. de Méd., June, 1897.

⁵ Jour. de Méd., Apr. 10, 1898.

⁶ Jour. de Méd., May 10, 1898.

flexion, extension, abduction, supination, etc., are observed. They may be rapid, so as to be described as choreiform, or slow, or suggest athetosis. The principal location is in the hands and fingers; but they may also be observed in the feet, or in the face if the fifth nerve is involved. These movements occur spontaneously, unintentionally, and frequently. Their range and vigor, however, are not usually great, and they must be carefully sought. They are much more common than is generally supposed.

E. Dambacher¹ gives the results of careful examination of a case of tabes, complicated, however, by a right-sided hemiplegia and some other conditions significant of a generalized syphilitic disease of the nervous system, with special reference to the **condition of the posterior roots**. These, in nearly every instance, were found affected a short distance from the spinal ganglion, at practically the point where they enter the subdural space and are covered by the pia. The spinal ganglia, as far as the investigations went, showed no changes; but the author did not use the Nissl method. He states his belief that the disease commences in the posterior roots, and results from a meningeal process which reaches them by continuity or affects them by strangulation.

Pel,² of Amsterdam, describes a case of locomotor ataxia in a waiter, 41 years of age, who also presented some symptoms of beginning parietic dementia. He had violent attacks of burning-pains in both eyes, accompanied by spasmodic contraction of the pupil, lacrimation, and swelling of the conjunctivæ. There was also hyperesthesia of the eyelids, rendering examination difficult at the time. The attacks lasted from 2 to 3 hours, and in the intervals the eyes were practically normal. The author considers these attacks as true **ocular crises**, and describes them as neurotic attacks of the ciliary nerves with irritation of the fifth.

Marinesco,³ from a study of the topography of **tabetic anesthesia**, describes 4 principal localizations: 1. Anesthesia of the trunk, usually distributed in horizontal patches. 2. Anesthesia in the upper limbs, usually limited to the internal surfaces of the arms, and extending often along the forearm and fingers. 3. Anesthesia in the perineoanal and genital regions, especially common in the lower portion of the scrotum. 4. Anesthesia in the lower limbs, especially in the plantar and dorsal regions of the foot, the dorsum of the toes, and the outer surface of the legs, and on the anterior surface of the thighs. He also notes what has not heretofore appeared in print, though undoubtedly frequently observed, that these anesthetic locations correspond to certain subjective symptoms of tabes; thus the cortical sensations are related to the chest- and arm-areas; bladder-troubles and impotence to the perineoanal distribution, and lightning-pains to the leg-areas. He also noted gastric crises in correspondence with anesthesia of the epigastrium; and in one case laryngeal crises were present with anesthesia of the laryngeal mucosa.

Ch. Achar and Leopold-Levy⁴ report a case, with autopsy, of locomotor ataxia with **retained reflexes**, and give clinical notes of 5 other cases. The cord-sections showed the posterior root-zone to be less involved than is usual, and to this fact they attribute, in agreement with Westphal, Krause, None, and others, the preservation of the knee-jerk in this disease. Five of their cases showed eye-symptoms, and the majority of the cases in which Westphal's sign fails also present eye-symptoms, especially those of the optic nerve. In other words, the upper levels of the cord are usually first and most involved.

¹ Deutsch. Zeit. f. Nervenhe., Mar., 1898.

² Berlin. klin. Woch., Jan. 10, 1898.

³ Sem. méd., Oct. 13, 1897.

⁴ Nouv. Icon. de la Salpêtr., No. 2, 1898.

Eichhorst¹ publishes 2 examples of **intermittent Argyll-Robertson pupil**, the only examples of this rare condition in 103 cases of tabes observed by this author in his clinic. The reflexes varied under continued observation, notwithstanding the steady progress of the disease, the symptoms of which were unmistakable.

Obersteiner² inclines to the view that tabes should be classed as a **tertiary manifestation of syphilis**. Probably exposure to cold, traumatism, and poisons can call forth or help to bring about the appearance of the disease even in the absence of syphilis. He believes that all the fibers of the posterior roots are involved, and that where only a certain number of fibers of the roots are degenerated the whole of their prolongation in the cord may be affected. This intramedullary affection of the prolongation of the fibers of the roots is the only one that is proved. He lays emphasis upon the point of entrance of the nerves into the dural covering where the medullary sheath is reduced to the minimum, and looks upon this as the place of least resistance. Here meningeal lesions and altered blood-vessels may lead to degeneration in the roots. The author, however, acknowledges that changes in the spinal ganglion are occasionally encountered; but they are slight in character, and the degeneration can be traced to some toxic agent. He denies that a primary interstitial overgrowth caused by vascular change can be accepted as sufficient explanation.

C. E. Philippe³ makes a study of the anatomic distribution of the **lesions** in this disease, based upon cases observed and cared for at La Salpêtrière. He reaches the conclusion that the interstitial lesions in the cord are secondary, and that the parenchymatous changes exist from the first, while the vertebral ganglion remains intact, and believes that the parenchymatous lesions in the cord are the first in order of development. He also found that the cellular elements of the posterior horn and column of Clarke were intact in these 10 cases; and, specifying still more closely, believes that of the exogenous fibers entering with the posterior root, those of middle length are the ones primarily affected. In the discussion of the clinical features he would divide tabes into two varieties, the benign and the grave, in proportion as the course is acute or tardy, and thinks there is a corresponding anatomic basis in that the benign variety may be considered as a root-form of tabes, commencing outside the cord or at the point of entrance; while the grave variety depends upon the rapid medullary extension of the lesion. The pains are referred to the root-lesions.

Otto Juliusburger and Ernst Meyer⁴ make a contribution to the study of the condition of the **posterior root-ganglion** in locomotor ataxia, based upon investigations with Nissl's staining-method. They found lesions of the granular substance of the cells and a tendency of the nucleus to displacement in 2 cases of tabes. These examinations were made with great care, and comparison with sections from a normal cord and with the plates of Lenhossek were used to check the findings. Raymond⁵ reports similar findings by Cornil.

Hereditary Ataxia.—Miura⁶ reports 3 cases, with 1 autopsy, which showed a marked atrophy of the pons, medulla, cerebellum, and cord. The posterior and lateral columns of the cord were not degenerated, presenting a sharp contrast to the condition in Friedreich's type of the disease. In the lower dorsal region the central canal of the cord was dilated, and for a short space double.

¹ Deutsch. med. Woch., No. 23, 1898.

² Berlin. klin. Woch., Oct. 18, 1897.

³ Arch. de Neurol., Sept., 1897.

⁴ Neurol. Centralbl., Feb. 15, 1898.

⁵ Leçons, Paris, 1897.

⁶ Proc. Med. Faculty Royal Japanese University, Tokio, 1898.

Sanger Brown¹ reports the postmortem findings in one of the cases of the family group reported by him 6 years ago. Practically the cerebellum was unmodified, but the tracts in the cord which are connected with the cerebellar function showed deficient conditions, rather of the nature of defective development than degeneration. The spinal cord as a whole showed some increase in the superficial neuroglia and a remarkably large number of starchy bodies similar to those seen in senile conditions.

Hereditary Spastic Paraplegia.—Weston D. Bayley² reports a family showing the disease in 5 generations, while other collateral relatives were also alleged to be affected, but could not be authentically traced. The cases showed a wonderful similarity, both as to the time and mode of onset, absence of sensory phenomena, and the state of the reflexes. It is noted that if an individual escape, immunity is conferred upon the descendants; the affection travels in a direct line.

Aschard and Fresson³ report 3 cases of **hereditary spastic spinal paralysis** in sisters. The first symptoms were remarked in both children when they commenced to walk, at the ages of 16 and 12 months, respectively, and were preceded in 1 case by an acute disease of indefinite character, and in the other by small-pox. Lorrain⁴ reviews the entire subject and tabulates 29 cases, but adds nothing new.

Progressive Spinal Muscular Atrophy, with Spinal Lesions in Young Children.—F. E. Batten⁵ epitomizes 5 papers on this subject appearing in recent literature. He concludes that the characteristics of the disease, as illustrated by these cases, are as follows: An apparently healthy and intelligent child, who has made normal progress to the age of 10 months, begins, without any sudden onset or known cause, to lose power, the weakness being first noticed in the muscles of the back. The disease pursues a progressive course, the shoulders, thighs, the upper arm, the forearm, and leg being successively involved; and finally the muscles of the hands and feet become affected, the parts being involved in the order above mentioned. No special group of muscles is affected. Fibrillary twitchings of the muscles are present in some cases. Bulbar symptoms may supervene and contractions of the limbs may be present in some cases. The limbs are absolutely flaccid; reaction of degeneration is often present; the deep and sometimes the superficial reflexes are abolished. There is, as a rule, no tenderness or pain, though the latter may be present. There is no disturbance of sensation; but again, in the cases just referred to, there was an extraordinary absence of pain to the stimulus by the faradic current. The sphincters are normal. The mental condition continues unimpaired throughout the whole course of the disease. The atrophy of the muscles becomes extreme, and the disease runs its course in, at most, a few years. Heredity plays an important part in the etiology of the disease; in one family of 6, 2 brothers were affected; in another of 15, 4 boys and 2 girls were affected; in a third family of 9, 2 boys and a girl were affected; and in a fourth family of 12, 8 were affected in one generation, and 2 girls and a boy in the second generation, through the mother. The evidence on which some of the above is based is open to doubt, as out of the above 22 cases only 4 were examined pathologically. In Thomson and Bruce's case there was no hereditary or family history. The pathologic condition which has been found in these cases is atrophy of the cells of the anterior horn, together with degenerative changes in the anterior nerve-roots and in the

¹ Brain, 1897.

³ Gaz. hebdom. de Méd. et de Chir., 1896.

⁴ Paraplégie spasmodique familiale, Paris, 1898.

² Jour. Nerv. and Ment. Dis., Nov., 1897.

⁵ Brain, 1897.

peripheral nerves. In the muscles sometimes simple atrophy is found; sometimes the condition usually found in cases of primary muscular atrophy. Whether the atrophy in the cells of the anterior horns is the primary lesion or is secondary to the condition of muscular atrophy is a point that is difficult to decide; certain evidence in the above cases would seem to point to the probable spinal origin of the disease.

Effect of Amputation upon the Nerve-cells.—G. Ballet¹ reports a case in which amputation had been done 3 years before death. By the use of Nissl's method he could find no lesions of the anterior-horn cells corresponding to the amputated limb, although such changes have been constantly detected within a short period after amputations. He imagines that after a certain time cells thus affected by amputation are repaired.

Multiple Sclerosis.—Reichel² reports 2 cases of multiple sclerosis, with isolated thermal anesthetics; in one instance confined to the outer half of the thigh and the leg and foot on the right side and to the foot alone on the left side. In the second case there was a thermal anesthetic area involving the right foot and leg, with a small spot on the outer side of the thigh. Hysterical stigmata were wanting. Schuster and Bielschowsky³ describe a typical case in a man of 20 years, who presented neither alcoholic addiction nor syphilitic infection. The case ran the usual course, and terminated fatally in about 6 months after the appearance of the first symptoms. The authors believe that the starting-point of the process is not in the parenchyma, but in the interstitial tissue, and they would call the process an interstitial chronic inflammation, attaching secondary importance to the vascular element, which they believe plays an intermediate role. A. Goldscheider,⁴ in the investigation of a well-marked case of a woman of 22, reaches the conclusion that multiple sclerosis is a form of disseminated myelitis in which the changes are analogous with those of acute myelitis, and originate from the vascular supply. Leopold Stigletz⁵ reports 3 cases of this disease in childhood, and reviews the literature of the subject, including the 35 cases tabulated by Unger. It appears that at least a third of the cases give a history of previous infectious disease, and about a quarter of them present a strong neuropathic taint. The author thinks that both these influences are of importance in the etiology. He notes that the prognosis in multiple sclerosis in children is less unfavorable than in adults, and directs attention to 3 cases in the literature in which recovery took place. [Adult cases recovering are not absolutely rare, and the prognosis in this disease is not so gloomy as the older text-books would indicate.]

NEUROSES DEPENDENT UPON INFECTION.

Tetanus.—Steiner⁶ records a case of tetanus in which there was no solution of continuity that could be observed. The disease ran a subacute course. At the end of a month a large purulent crust was sneezed out of the nose and the patient promptly recovered. Steiner believes that this was the infection-focus, and explains what might formerly have been called a case of rheumatic tetanus. He imagines that the nose was infected by inhaling dust. In a second case he obtained prompt and satisfactory results from the use of antitoxin, but he does not state the length of the incubation-period. Wassermann and Takaki⁷ declare that the normal central nervous system has certain anti-

¹ Progrès méd., July 31, 1897.

³ Neurol. Centrbl., p. 1119, 1897.

⁵ Am. Jour. Med. Sci., Feb., 1898.

² Wien. klin. Woch., 1897.

⁴ Zeit. f. klin. Med., Band xxx.

⁶ Wien. klin. Woch., No. 36, 1897.

⁷ Berlin. klin. Woch., Jan. 3, 1898.

toxic qualities. They mixed from 1 to 10 times the lethal dose of tetanus-poison with an emulsion of normal brain- or spinal-cord substance, and the resulting mixture lost its toxic properties to a certain extent. Mixtures of tetanus-poison with emulsions from other tissues had no similar effect. The authors succeeded in immunizing animals by injections of emulsions of brain and spinal cord as late as 24 hours after the injection of 3 to 5 times the lethal dose of tetanus-poison, and were able to keep animals alive which had been injected with a lethal dose by using an emulsion 4 to 6 hours later. The brain-emulsion seems somewhat more efficient than that obtained from the cord; but neither the clear fluid obtained from the emulsions by the centrifuge nor cerebrospinal fluid possessed antitoxic properties. These experiments tend to support Ehrlich's view, that the tetanus-poison combines with the cells of the spinal cord, and indicates the elective tendency of the poison which is manifested in the clinical features of the disease.

J. E. Owens and J. L. Porter¹ report 3 cases, 2 treated with **tetanus-antitoxin**. They review some of the statistics regarding the mortality of tetanus treated by ordinary methods and by antitoxin, and find it is practically the same. Jacob Friedman² reports 2 cases of trismus nascentium successfully treated by antitoxin, as prepared by Gibier, of New York. In each case 2 bottles were used, in divided doses, and the serum was absorbed in 6 hours. There was no rise of temperature, no eruption or other disturbance. Immediate improvement resulted. In addition the patient received about 1 gr. of chloral every 3 hours.

E. Roux and A. Borrel³ report a case of acute tetanus occurring 2 or 3 days after injury to the fingers, in a boy of 16, that was treated by **intracerebral injection** of 1½ c.c. of freshly prepared concentrated serum. A trephine was applied over the right second frontal convolution, and the injection made at that point. Improvement followed, and under general treatment and a number of subcutaneous injections of antitoxin complete recovery resulted. The idea of the operators was to place the toxin immediately in contact with the brain-substance at a point where it would not disturb motor function, and where it would immediately counteract the effect of the tetanus-toxin upon the brain-cells. [This case, though appearing early, was evidently subacute, involvement of the trunk not occurring until 18 days after the original injury, and 14 days after the first symptoms appeared. The plan, however, is one that commends itself, owing to the time that must elapse before subcutaneous injections through the blood-current reach the brain-substance in sufficient quantity to have the best results.] Tizzoni⁴ reports an important series of experiments proving that it is possible to render animals immune against tetanus by injecting Fränkel's pneumococcus.

Tetany.—Berlitzheimer⁵ reports a case of **gastric origin**, and is able to find only 11 other cases on record. In this case, which presented all the pathognomonic indications of tetany, there was found a suppurating cyst of the pancreas, with dilatation of the gall-bladder and jaundice. The contents of the stomach contained no ptomains on chemical examination; and a mouse injected with the contents died of septicemia due to the staphylococcus. [It is apparent, therefore, that tetany may have been due in this case to a number of causes other than those attributable to the stomach.]

Chorea.—M. V. Ball⁶ reports a case of **paralytic chorea** in a female child, 7 years of age, who one year previously had suffered from an ordinary

¹ Jour. Am. Med. Assoc., Nov. 13, 1897.

² Ibid., Oct. 9, 1897.

³ Presse méd., June 18, 1898.

⁴ Gaz. degli Ospedali e delle Clin., Mar. 6, 1898.

⁵ Berlin. klin. Woch., Sept. 6, 1897.

⁶ Phila. Med. Jour., Feb. 12, 1898.

attack of chorea which had promptly subsided under treatment. She presented a temperature of 101° F., pulse of 140, and irregular respirations varying from 80 to 100. There were slight choreic movements about the lips and in the arms. Faint murmurs were heard over the cardiac area. A week later speech was limited to a few words and the limbs were atonic, so that voluntary movement was practically impossible. The patellar tendon-reflexes were absent. Sensation was preserved and the muscles of the face were unaffected. The sphincters were active. The child gradually improved to fair recovery, but the heart-lesion persisted.

Legay¹ has collected statistics in which it appears that chorea is found in those who have a **neurotic heredity**, with almost always a recent infection. This, in the majority of cases, is rheumatism; but there are cases of chorea arising from other causes more specific—measles, pneumonia, scarlet fever, typhoid, influenza, variella, and even boils, with marked glandular enlargement, eruptions on the head, and suppurative otitis. M. Marfan² returns to the subject of chorea and its relation to diseases of **the heart**, and concludes that chorea is either preceded by acute rheumatism or by an infectious disease. He is distinctly in favor of the infection-theory of chorea, and believes it is a neurosis provoked by a nonspecific infection which is developed in predisposed soil. He rejects theories which makes chorea a specific infectious disease or a neurosis of cerebrospinal evolution. He concludes that there is an etiologic identity between chorea and endocarditis, the two arising from the same cause, which explains their coincidence.

S. Weir Mitchell and J. H. W. Rhein³ call attention to Mitchell's descriptions of the **motor symptoms** of this disease, and attempt to establish species based upon the motor difficulties: "1. Cases of chorea which show some at one stage of the disease, some throughout their course, an absence of movement during rest, requiring muscular action to develop what may be either mild or severe choreiform movements. 2. There are cases in which the movements are continuous during rest, but become greatly increased on intentional effort. 3. There are cases with severe choreiform movements, which disappear entirely when muscular acts are performed. 4. In some cases the movements seem to be unaltered by voluntary muscular efforts. 5. There are cases which present during their course, at different times, more than one of the types described." [The paralytic form of chorea is omitted in this description.]

Rabies.—Calabrese⁴ reports a girl of 18, of neuropathic family history, bitten on Dec. 11 by an apparently healthy dog. The wound was treated simply and the patient remained well up to the forty-fifth day, when she read an account of a case of hydrophobia. The next day she complained of pains in the back and felt badly. Jan. 30 digestion was disturbed and coldness in the lower limbs was experienced. The next day there was complete paraplegia, nasal voice, dysphagia, and catching respiration. Feb. 2, removed to hospital. Feb. 3, temporary improvement in the power of the limbs; the patient refused to drink or eat, though it was possible for her to do both. There was paresthesia over the arm, thigh, and right foot; hyperesthesia over the ovaries and mammae. Contraction of the visual field. Knee-jerks were absent. The wound of the bite was entirely healed and quiescent. She therefore presented well-marked stigmata of hysteria. Feb. 5 the patient became worse, the temperature rose, coma set in, and she died on the 8th. Portions of the spinal cord and sciatic nerve were excised, and when injected in rabbits gave rise to typical rabies. [The case is of importance as throwing light upon some

¹ Thèse de Paris, 1897.

³ Phila. Med. Jour., Jan. 22, 1898.

² Sem. mcd., 1897.

⁴ Riforma Med., July 26, 1897.

instances in which hysteria mimics rabies and others in which apparently they are associated.]

TROPHONEUROSES.

Acromegaly.—Pearce Bailey¹ reports a case of acromegaly with post-mortem, at which the thymus was found replaced by a mass of fibrous fat and lymphoid tissue. The thyroid was enlarged symmetrically and filled with small cysts. The gland-substance was normal under the microscope, but there was increase in the interstitial tissue. The pituitary body was enlarged, and a portion of it presented the consistence and the microscopic appearance of an adenoid tumor. He also reports a case in which a hemorrhage had taken place into the pituitary body subsequent to adenomatous enlargement of the gland. Certain symptoms presented by the patient led to the suspicion that this might be a case of acromegaly in the early stage, before modification of the skeleton had appeared, and he refers to Tamburini,² who brings forward the theory that the first stage of the pituitary change is associated with enlargement and increased function, followed by degenerative transformation, adenomatous, sarcomatous, or cystic in character. Fr. Schultze and Jores³ report upon 2 cases of acromegaly, 1 with autopsy. Both cases were typical. The 1 which came to section presented tumor of the hypophysis, with persistent edema and enlarged thyroid. Adolf Strümpell⁴ reports a typical case in a woman who had been under observation for a number of years. There was an hypophysis-tumor which had made pressure upon the optic tracts. Both the olfactory nerves were greatly compressed. In his general discussion of the pathology and anatomy of the disease he points out that the tumor in this case was of angiosarcomatous nature, and refers to other instances of a similar sarcomatous change in what was apparently at first an adenoma. He is inclined to believe that the enlargement of the hypophysis is practically essential to the disease, but whether as a primary or secondary condition he is unable to decide. O. T. Osborne⁵ gives further report of a case first published by him in the *Am. Jour. Med. Sci.*, June, 1892. He found at the postmortem that the sella turcica was very much enlarged and contained a cystic pulpy mass, which was filled with yellow serum. Sections of this mass showed cells of irregular arrangement and a small amount of granular intercellular material. He is inclined to look upon it as sarcomatous. The thyroid was greatly increased, especially in its connective-tissue elements, and a supernumerary thyroid was also found. The thyroid gland contained but 0.15 mg. of iodine, about one-twentieth the amount which Baumann claims for the normal thyroid. Microphotographs of sections from the pituitary body and thyroid gland, and photographs of the skull and other bones of the skeleton, with skiagraphs, illustrate the article.

Hypertrophic Pulmonary Osteoarthropathy.—E. M. Hasbrouck⁶ reports a case of this peculiar trophic disturbance of the hands, affecting especially the distal phalanges, apparently secondary to sarcoma. The pulmonary element was furnished by a firm, solid sarcomatous body binding the aorta, esophagus, and trachea. In addition there were sarcoma of the mouth and several sarcomatous areas of the lungs. R. B. Preble⁷ describes the case of a Polish laborer, 32 years of age, who presented a well-marked case of tetany, and was found to have a greatly dilated stomach, which distended under gas-

¹ Phila. Med. Jour., Apr. 30, 1898.

² Centralbl. f. Nervenh. u. Psych., Dec., 1894.

³ Deutsch. Zeit. f. Nervenh., Band ii., 1897.

⁴ Ibid.

⁵ Yale Med. Jour., Nov., 1897.

⁶ N. Y. Med. Jour., May 14, 1898.

⁷ Medicine, Jan., 1898.

eous dilatation a hand's breadth below the umbilicus and far to the median line. The patient also presented the drumstick-fingers of the so-called pulmonary hypertrophic osteoarthritis of Marie; but subjectively he had no symptoms of disease of the heart or lungs. A careful examination indicated that they were normal in all respects. Preble therefore believes that the putrefactive changes in the gastric contents supplied the toxins which led to the osteal changes. The skiagraph showed some enlargement of the distal phalanges; but the most marked lesion of the bones was their relative transparency. This appearance, however, may be due to some fault in the skiagraphic method.

Exophthalmic Goiter.—A. Sanger¹ questions the propriety of operating upon the thyroid in Graves's disease, and emphasizes the danger of such interference. In one case of his own, the right lobe of the thyroid gland was removed. At first palpitation was a little improved, but the other symptoms remained stationary. A little later all the symptoms were aggravated, and the case was worse than before the operation. On the other hand, Schulz² reports 14 cases of Basedow's disease, under Kummell, treated by the partial removal of the thyroid. Most cases were severe. Twelve of the patients were completely cured and able to resume ordinary occupations. In 2 the operation was followed by much improvement, exophthalmos alone remaining, with a tendency to further improvement. The experience of the author is that partial thyroidectomy in the majority of instances produces a cure which is permanent. In only 1 case has there been any return of the enlargement of the neck. The tendency is for the remaining portion of the gland to shrink rather than to increase in size. J. A. Booth³ also reports 8 cases of exophthalmic goiter treated by **partial ablation of the thyroid**, with 5 cures, 1 death, no benefit in 1 case, and in 1 slight improvement. J. Griffith⁴ reports a case of exophthalmic goiter in which the exophthalmia was not especially marked, but the patient was unable to close the lids. This resulted in destruction of the cornea, and finally double **enucleation** had to be performed. J. Hinshelwood⁵ reports a case of exophthalmic goiter which presented some **peculiar eye-symptoms**. Under treatment by antipyrin the retraction of the upper lid (Stellwag's symptom) disappeared, while the failure of the lid to descend upon downward movement of the eye (Graefe's symptom) remained unchanged. These two symptoms are regarded as being due to the same cause—viz., spasm of Muller's muscle supplied by the sympathetic nerve, and the complete disappearance of one with the persistence of the other would indicate that some other mechanism must be in play. The author is inclined to attribute Graefe's symptom to a central disturbance of the oculomotor nuclei.

Bayard Holmes⁶ reports a **family form**, embracing 4 children in a Swedish family, showing the 3 cardinal symptoms and a number of the minor conditions found in the disease. The causation is not explained. The family is living under tolerably healthful conditions and there is no hereditary history.

MYXEDEMA.

Myxedematous Infantilism.—E. Brissand⁷ returns to this subject with an admirable article fully illustrated. He believes that infantilism is invariably due to thyroid insufficiency. He would go further, and insists that

¹ Munch. med. Woch., Apr. 6, 1897.

³ Med. Rec., Aug. 13, 1898.

⁵ Ibid., June 25, 1898.

² Berlin. Klinik, June, 1897.

⁴ Brit. Med. Jour., Aug. 20, 1898.

⁶ Phila. Med. Jour., June 11, 1898.

⁷ Nouv. Icon. de la Salpet., July-Aug., 1897.

suppression of the thyroïdal tissue determines dystrophies of the skin and of the skeleton; while abolition of the parathyroïdal function provokes nervous accidents, and particularly the intellectual disturbance associated with myxedema. William Osler¹ discusses **cretinism**, upon which he so fully wrote in 1893, making a further contribution. Joining recent reports with his former article, he is able to list 60 cases, many of which are illustrated. He reaches the final conclusion that "the changes characterizing cretinism, anatomic as well as sporadic, result from loss of the function of the thyroid gland," and gives importance to the continuous treatment of the disease by thyroid preparations.

Henry Koplik² discusses the subject of the ultimate results of **thyroid therapy** in sporadic cretinism, and quotes cases and experience to show that cretins may be kept in a reasonable condition of health by the continuous use of thyroid feeding or other methods of thyroid exhibition. Improvement in cretins is dependent upon early institution of the treatment. Infantile cases practically go on in growth and mental development on lines parallel to those in normal individuals as long as the treatment is continued. In adolescent cretins the mental advancement is not so pronounced; and in adults there is much less improvement both in physical growth and mental acquirement.

Mossé and Cathala³ report the case of a goitrous mother, showing neither myxedema nor cretinism, whose child, born with a bilobed goiter, but without other evidence of cretinism or myxedema, was rapidly perishing from inanition, though the mother's physical health appeared to be perfect and she had an abundance of milk. The mother was put upon thyroid treatment, and in a month showed a slight diminution of the goiter. The child in the meantime showed a notable improvement; its goiter diminished and almost disappeared; it took on flesh and presented the ordinary appearance of a child of its age. [This case bears out the rule laid down by Kocher (see YEAR-BOOK for 1898), but also indicates that the thyroid activity of the mother may be adequate for the child through the milk-medium, and serves to explain the reason that myxedematous conditions frequently appear in the second year of life—viz., after weaning.

William MacLennan⁴ reports several cases of obesity and myxedema treated by a preparation of thyroids which is named "thyroglandin." It is claimed for this preparation that it is free from the active poisons and retains the active constituents of the gland. It is prepared by the following process: 1. Selected and healthy glands are macerated in cold water, which extracts the soluble iodoglobulin. The solution is decanted or filtered off, and is evaporated to dryness at a temperature of 212° F. The resulting product is reduced to a fine powder. 2. The residual glands are then boiled for an hour with a weak solution of caustic soda, which eliminates the thyroïdin. After filtration the solution is exactly neutralized with hydrochloric acid, evaporated to dryness, and powdered. The two powders so obtained (iodoglobulin and thyroïdin) are mixed, and constitute thyroglandin. The preparation thus made has undergone thorough sterilization, and is therefore free from anything deleterious in the way of organic poisons which might set up so-called thyroïdism, and at the same time contains the iodoglobulin and thyroïdin. It is stable if kept perfectly dry, and does not deteriorate. In the case reported it acted with excellent efficiency. Robert Hutchinson,⁵ in a very able article on the pharmacologic action of the thyroid gland, adverts to the statement of MacLennan given above, and

¹ Am. Jour. Med. Sci., Oct., 1897.

³ Bull. de l'Acad. de Méd. de Paris, Apr. 12, 1898.

² N. Y. Med. Jour., July 16, 1898.

⁴ Brit. Med. Jour., June 19, 1898.

⁵ Ibid., July 16, 1898.

denies that thyroglandin contains only the active principle of the gland, or that it is a better preparation than the one advocated by himself (see YEAR-BOOK for 1898), which consists of the precipitated colloid, which is active in doses one-half as large as those specified for thyroglandin.

The Thyroid.—R. H. Cunningham,¹ after a long series of experimental tests on the subject of the physiology of the thyroid and its relation to pathologic states, reaches the following conclusions: 1. Absolutely fresh thyroid gland is not poisonous, in the usual sense of the term, when absorbed through the alimentary canal. 2. The symptoms of induced thyroidism are manifestations of an intoxication resulting from the ingestion of decomposed thyroid material, a conclusion that agrees in part with previously related observations of Lanz. 3. The so-called experimental thyroidism is not specific for the thyroid alone, for the ingestion of many substances derived from animal tissues other than the thyroid gland may produce an intoxication strikingly similar in every respect to that of experimental thyroidism. 4. Most, if not all, animal tissues yield substances which, if injected in large quantities directly into the circulation or beneath the skin, will produce an intoxication often very similar to that produced by injections of various substances derived from the fresh thyroid tissue. 5. The effects resulting from intravascular or subcutaneous injections of aqueous extracts, decoctions, and concentrated extracts of the thyroid tissue, of the thymus, of muscle, etc., are by no means necessarily indicative of the function and the action of the hypothetical internal secretions of the same tissue during life. 6. The utilization of the fact that ingestion of decomposed thyroid material produces on certain occasions an intoxication with certain symptoms similar to those of Graves's disease is not justifiable for the furtherance of the theory that the symptoms of exophthalmic goiter result from an overproduction of the thyroid secretion. 7. Our results lead us to conclude, with Dreschel, that the fresh thyroid tissue yields at least probably two substances that are capable of palliating the symptoms of acute cachexia in totally thyroidless dogs. 8. Neither of the above substances is an enzyme, nor does either contain iodine. 9. Neither the feeding of minced raw thyroid glands nor the injection of aqueous thyroid extracts, decoctions, and concentrated solutions of the extracted palliative thyroid principles is capable of keeping totally thyroidless young dogs alive longer than a few weeks (possibly 3 weeks). Still less capable are the thyroid preparations containing decomposition-products. 10. The presence of one, or usually several, small accessory thyroid bodies, which gradually hypertrophy and wholly or partially assume the functions of the excised thyroid lobes, accounts for the occasionally long survival of thyroidectomized, thyroid-fed young dogs. 11. Totally thyroidless young dogs are so quickly overwhelmed by the cachexia, and the intervals between the thyroidectomy and the onset of severe dyspneic attacks and subsequent deaths differ so slightly, no matter which of the usual varieties of fresh food is employed, that the kind of fresh food cannot be unquestionably affirmed to influence the onset of the cachexia in any especially definite manner. Animal foods in which constituents poisonous to rabbits have developed probably hasten slightly the onset of the severer symptoms, and the vaunted remarkable modifying influence of a diet of ordinary milk, such as Breischner observed, does not exist in the case of the totally thyroidless dog. 12. Monkeys whose general metabolism is disturbed in consequence of the removal of a greater portion of the thyroid gland, evidently become more susceptible to those constituents of meat that are poisonous to rabbits, and sufficient clinical evidence exists for concluding that probably a like susceptibility to animal

¹ Jour. Exper. Med., vol. iii., 1898.

foods containing such constituents also exists in man when the function of the thyroid gland is sufficiently disturbed. 13. And, finally, as regards the thyroid factor in the pathology of exophthalmic goiter, the writer agrees with Gley that the majority of symptoms in many patients with that disease can apparently, from an experimental standpoint, be as plausibly explained by the hypothesis of partially deficient thyroid activity as by the hypothesis of augmentation of thyroid function.

PSYCHONEUROSES.

Mental Condition of the Subjects of Ovariectomy.—Gallois and Beauvois¹ allege that the disturbance observed in ovariectomized subjects are not dependent upon hysteria, lacking the stigmata of that neurosis, but rather resemble neurasthenia of a particular sort, which is characterized by corporal and mental apathy, by irritability and sadness, and sometimes by delusion of persecution, reaching almost to the verge of insanity. The memory is enfeebled, the sleep disturbed by nightmare, and there are frequent complaints of head-pains. These troubles are not always constant, and it is difficult to estimate their frequency. It seems that the younger the woman the more likely she is to develop these disturbances; and neurotics and hypochondriacs usually have their conditions aggravated. The duration of the neurasthenic state is long, and usually only subsides at the regular period for the menopause.

F. X. Dercum,² on the subject of the relation of the great neuroses to pelvic disease, after a masterly examination of the question, reaches the following conclusions: 1. That neurasthenia may exist independently of any local disease, pelvic or otherwise. 2. That there is no *necessary* relation between neurasthenia and pelvic disease when the two affections happen to coexist in the same case. 3. That when pelvic disease occurs in a case of neurasthenia the pelvic symptoms may be more readily recognized by the patient, and therefore become more prominent; because in neurasthenia there is an increased reaction to local impressions, nervous weakness, and nervous irritability going hand in hand. As regards hysteria, the conclusions appear to be: 1. That hysteria may exist independently of any local disease, pelvic or otherwise. 2. That there is no relation between pelvic disease and hysteria, even when the two affections coexist in the same case. 3. That while in hysteria there is increased reaction to external impressions, this reaction is purely psychic. In hysteria the patient is exceedingly impressionable and reacts inordinately to impressions involving the affective faculties. This reaction to external impressions differs altogether from that seen in neurasthenia, for in the latter the reaction involves the nervous system as a whole. In hysteria the patient readily accepts the suggestion—often a spontaneous autosuggestion—of pelvic disease, especially as groin-pain or inguinodynia is so common a symptom of hysteria. 4. That the pain-areas of hysteria bear no relation to disease of the deeper structures.

S. Weir Mitchell³ opened a discussion on this subject before the College of Physicians of Philadelphia, in which he said, among other things, "In no case seen by me have ablation of the ovaries and termination of menstruation cured epilepsy. . . . That the climacteric puts an end to these disorders is an old delusion; in fact, the change of life, so called, is quite as apt to make them worse as to better them. . . . A large percentage of these cases are not made better by operation; but, on the contrary, are made much worse or else gain

¹ Bull. méd., July 24, 1898.

² Am. Gyn. and Obst. Jour., Aug., 1898.

³ Univ. Med. Mag., Mar., 1897.

nothing on the side of the neurosis. . . . In all my life I have met with but 4 reflex epilepsies; none was from uterine or ovarian or tubal disease. . . . Hysteria is not a disease of sex, and is not often cured by oöphorectomies alone, even such as are justified by physical disease." Charles K. Mills, further in the discussion, said: "I am inclined to make the assertion that real epilepsy and real hysteria or real melancholia were never absolutely caused by pelvic disease."

Epilepsy.—A. P. Ohlmacher¹ gives an account of 6 cases of epilepsy which came to autopsy. The first was an adult female, found dead in bed. There was a persistent and enlarged thymus gland, prominent epiglottic papillæ, enlarged tonsils, bronchial and mesenteric glands, enlarged spleen, with prominent follicles, and pronounced hyperplasia of intestinal lymph-follicles. The second case, which died from maniacal exhaustion, presented a persistent thymus and hyperplasia of the mesenteric and splenic follicles and of the mesenteric and bronchial glands. The third case presented periodical suicidal mania, and finally killed himself by cutting his throat. There were persistent thymus, enlarged spleen with hyperplastic follicles, hyperplasia of intestinal follicles and bronchial glands, and narrow aorta. There were remnants of the thymus present. A fifth case died from carcinoma, and also showed remnants of the thymus gland. A sixth case, dying from chronic heart-disease, showed no trace of thymus. From the sudden character of epileptic attacks, laryngismus stridulus, and death occurring in thymic asthma, Ohlmacher is inclined to attach much importance to the persistence of the thymus and remnants found in 5 out of 6 cases of epilepsy. He² adds another case of epilepsy to those previously reported, in which a persistent thymus was also found. The ileum presented enlarged cellular lymph-follicles, and the patches of Peyer were hyperplastic. De Cesare³ records 8 cases of epilepsy treated by Beecher's method, with a mixture of potassium bromid, codéin, and *Adonis vernalis* given twice a day. In 4 cases there was complete suspension of the fits; in 3 other cases the fits were replaced by infrequent attacks of vertigo; and in the last case there were 4 attacks of vertigo and 2 convulsions. In every case the attacks were reduced in frequency and no bad results were observed. The pulse was fuller, digestion not impaired, temperature normal, diuresis increased, sleep uninterrupted and calm, and the mental condition unchanged.

F. Peterson⁴ contributes a practical article upon the beneficial effects due to the **withdrawal of the bromids** in the treatment of epilepsy, giving a number of very suggestive cases in which, after the continuous use of bromids, the manifestations of epilepsy and the condition of the patient were greatly improved by their immediate withdrawal, and insists that this withdrawal of bromids must be taken into consideration in estimating the beneficial effects of a change of treatment.

Cabito⁵ has observed that the **sweat** of epileptics has an increased **toxicity** previous to the fits analogous to that of the urine. He obtained the sweat for these experiments by means of the hot-air bath, and its use suggested to him its employment as a therapeutic agent. He has given the treatment a trial, and is convinced that it is a means of preventing and interrupting epileptic attacks. It should be employed whenever the prodromal symptoms manifest themselves; and its beneficial effects are not merely transitory, having some influence upon the organic system as well as upon the skin, an influence favoring elimination of the poisonous element. He would not, however, exclude

¹ Phila. Med. Jour., Jan. 1, 1898, and Bull. Ohio Hosp. for Epileptics, Jan., 1898.

² N. Y. Med. Jour., Sept. 24, 1898.

N. Y. Med. Jour., Sept. 25, 1897.

³ Riforma Med., Aug. 13, 1897.

⁵ Riv. Sper. di Fren., 1897.

other measures. Mavrojanis¹ has repeated the experiments of Cabitto, and denies them *in toto*.

Fichaux² reports a number of cases of epilepsy in **gastric attacks**. In a case stated, a girl of 22 would suddenly cry out with severe pain in the epigastrium, become exceedingly pale, present a slight loss of consciousness lasting 2 or 3 seconds, during which she was entirely anesthetic, and upon recovering consciousness experience a feeling of fatigue and headache which lasted an hour or more. The attacks became much less frequent under bromids. In all cases collected by the author, and the literature of the subject is very scanty, there was the same sudden onset.

W. Ossipow³ reports upon **contractions occurring in the stomach, intestines, and bladder** during epileptic attacks. His experiments were made upon dogs by means of an induction-current supplied to the brain, or by the intravenous injection of absinthe-essence. He reached the following conclusions: 1. During the epileptic attack contractions of the stomach, intestines, and bladder appear, commonly after the beginning of the fit. 2. Contractions of the stomach take place in about 50% of the cases, involving both cardia and pylorus. 3. Contractions of the small and large intestines and of the bladder furnish one of the common phenomena of the epileptic attack: (a) The duodenum presents contractions in the beginning of the clonic period of the fit and shortly after the appearance of the ordinary muscular movements; (b) the small intestine usually begins to contract in the middle of the clonic period of the epileptic attack; (c) the large intestine is affected in the tonic or the clonic period of the epileptic attack, but most commonly at the beginning of the clonic period; (d) contraction of the bladder comes on generally at the beginning of the tonic period. 4. The contractions of the intestine and bladder are very strong, and have the character of a persistent spastic spasm. 5. Between two strong contractions, in the majority of cases, there occurs a longer or shorter parietic relaxation of the intestine and bladder. 6. The contractions above described are not the result purely of electric irritation of the cortex or of the stimulation from absinthe, but are an integral part of the major manifestations of epileptic fits. 7. Asphyxia in the epileptic attack is related in point of time to the contractions of the stomach, intestine, and bladder. 8. The severe pressure of the abdominal wall upon the stomach, intestines, and bladder, and their contents, appears also to be related in point of time to the contraction of the organs mentioned. 9. Evacuation of the bladder and rectum results from the contraction of the viscera as well as from the pressure of the abdominal wall. 10. There is an analogy between the epileptic spasms of the striated muscles and the contractions of the stomach, intestines, and bladder during the epileptic attack, in the sense that they both depend upon the motor control of the cortex.

Negro and Oliva⁴ record the case of a young girl affected with epilepsy, the spasm beginning in the first two fingers of the right hand, and then gradually involving the arm and becoming generalized. An **operation** was done, uncovering the motor cortex on the left side; but electric stimulation of the brain caused no movements of the corresponding upper extremity. Two days later the wound was opened without anesthesia, and the patient with full consciousness aided the exploration of the cortex with electricity. Feeble excitation gave rise to a sensation of formication commencing in the fingers, at the root of the extremity, etc., depending upon the location of the electrodes. A stronger stimulus gave rise to the same sensation, and, in addition, to movements of the hand or shoulder. After the séance the patient presented a paresis of

¹ Jour. de Méd., Aug. 7, 1898.

³ Neurol. Centralbl., June 15, 1898.

² Thèse de Lille, 1897.

⁴ Poli. del Policlin., Dec. 31, 1897.

the entire right upper extremity, especially marked in the hand, with predominance for the movements of extension, and both subjective and objective disturbance of sensation, consisting in feelings of fulness and formication, anesthesia to touch, pain, and heat. The sensory disturbance disappeared at the end of 3 weeks; the motor disturbance persisted longer. The epilepsy did not recur, but the patient died 5 months later, of typhoid fever.

Hysteria.—C. S. Potts¹ reports a case of hysterical **bradycardia**. Cases of rapid heart in hysteria are sufficiently common, but slow pulse due to the neurosis is so rare as to have practically no representation in the literature. The case was a man of 42, of nervous family and of nervous temperament. Following an attack of cholera morbus and a great deal of worry and annoyance, he complained of violent pains in the epigastrium. There was some delirium, and no treatment benefited him until lavage of the stomach was practised. This was distasteful, but the gastric symptoms improved. The pulse was noted to be 40 to the minute, regular and strong at this time. The man suddenly lost power in one arm for several hours, and then suddenly recovered it. When seen by the author the pulse was 48 and the patient was emotional and hysterical. A stocking-type of analgesia in the right arm was present, extending to the deltoid. The patient complained of pain and general depression. The next day an area of hyperesthesia, extending about 3 in. in all directions from the left nipple, was found. The pulse was 54. Finally the pulse became normal and all symptoms disappeared except the hyperesthesia about the nipple, and this subsided after a few applications of faradic electricity.

J. Middlemass Hunt² discusses the treatment of **hysterical aphonia**, and emphasizes the value of vocal training and exercises in breathing. He believes that a bad habit or trick of speaking is in part at the bottom of the trouble. He first makes a laryngoscopic examination to ascertain whether the case is really hysterical aphonia, and whether the ventricular bands approximate on attempted phonation; then with the mirror in the larynx he directs the patient to phonate, beginning with the vowel e, which is the most easily sounded, and passing on through the whole series. When the patient can sing all the vowels with the mirror in position he withdraws it and repeats the exercise, keeping hold of and slightly directing the tongue forward. It is then continued with the tongue released. He then sings the numbers 1 to 10 with the patient, in order to bring in the consonants, and then directs the patient to pronounce the numerals shortly and sharply in a speaking-voice. From the numbers he passes to reading aloud, then ordinary conversation. All this requires time and patience, and lessons lasting from half an hour to an hour or more. He believes that the patient's attention must be directed to the larynx, and for this purpose uses massage or compression, as directed by Oliver. He has the patient place the fingers on the larynx, in order to feel the vibrations, and claims to be able to restore the speaking-voice in the way described always at the first sitting, after which the patient is handed over to a teacher for daily exercises in vocalization, with the aid of a piano, if possible. He believes that electrization of the larynx, cauterizing its mucous membrane, and other local applications are valuable simply through their suggestive effect.

Von H. Higier³ reports 2 cases of what he considers to be **hysteria in animals**, 1 in a cat and 1 in a bird. The case of the cat was the more decisive, and is as follows: A 9-months-old cat was nipped in the back by a dog, and immediately became paraplegic. Five or six weeks after, Higier found

¹ Phila. Med. Jour., July 9, 1898.

² Treatment, Oct., 1897.

³ Neurol. Centralbl., July 1, 1896.

that the hind quarters and hinder extremities were entirely anesthetic to deep needle-pricking, but noted that there was no loss of control over the bladder or rectum. He was inclined to think, however, that there might be a myelitis, when the entire matter was cleared up through an experiment made by the housemaid, who dropped the cat out of a second-story window to see if it was able to land on all fours, as a normal cat would do. The cat fell properly on its feet, immediately ran away, and the paraplegia completely disappeared. The few instances of alleged hysteria in animals are cited from the literature by the same author.

NEURASTHENIA.

E. Biernacki¹ refers to 2 cases of neurasthenia, previously published by him, in which he had detected sluggish coagulation of **the blood**. Following up this matter, he has determined that in a considerable number of cases of neurasthenia some tendency to lack of fibrinogen is apparent, and the same has been demonstrated in these cases by actual analysis at the hands of his former assistant, Luxembourg. On the other hand, in hysteria he finds that the coagulation-tendency is greater than normal. Upon examination under ordinary conditions the fibrinogen amounts to about 2 per 1000. In neurasthenia it is reduced to 1.7. In hysteria it usually rises to 4 per 1000. In these cases the number of blood-cells, the quantity of hemoglobin, and amount of plasma were practically normal. The modification of the fibrinogen is associated with the oxidation-processes, and he has found that oxyhemoglobin is correspondingly modified. In some cases the amount of oxygen in the blood has been so great as to render blood in the venous circulation of an arterial redness. In the consideration of the question whether the change in the make-up of the blood is primary or secondary, he is inclined to think that it is the first step in the process, the nervous symptoms being its manifestation. His argument on this point is that the blood-changes are constant and the nervous symptoms are variable. He concludes that the so-called functional neuroses—viz., hysteria and neurasthenia, are not primary diseases of the central nervous system, but are only secondary symptom-complexes following the action of the primary oxidation-disturbance upon the nervous system. He therefore considers hysteria and neurasthenia as diseases of a similar sort to diabetes, gout, and obesity, which are also associated with disturbances of oxidation-processes. Incidentally he remarks that a well-developed hysteria or neurasthenia is practically incurable, about as manageable as diabetes or gout, and points out the tendency of the disease to remit and recur. [Practical measures to control modification of the oxidation-process are not referred to, nor does the author make investigations in other nervous diseases, as far as shown by the article, as a check upon the blood-state in the neuroses mentioned.]

Ausset² discusses the **hemorrhages** which may occur as part of the symptomatology of neurasthenia. In a case of hematemesis he found that the ejected blood was more watery than under ordinary circumstances, the hemoglobin being reduced to a fifteenth of the normal amount and the red corpuscles much lessened in number. The blood upon staining divides into 3 layers: at the bottom a thick grayish layer, consisting chiefly of epithelium-cells; above this a middle layer of red corpuscles, almost devoid of color; and an upper layer of dissolved hemoglobin. Such attacks are usually connected with vasomotor disturbances in other parts of the body. The hemorrhages generally occur only once, and the patients are soon able to go to work. The author believes these hemorrhages

¹ Neurol. Centralbl., Mar. 15, 1898.

² Rev. de Méd., 1897.

are due to vasomotor paralysis, leading to rupture of the capillaries situated in and about the glandular epithelium.

Höflmayer¹ calls attention to **cardiac murmurs** in neurasthenia and hysteria. In 334 cases he found a systolic murmur twice and a diastolic murmur once, and suggests that these conditions are due to a weakening of the center for innervation of the cardiac muscle, due to venous congestion and increased acidity of the blood, leading to imperfect contraction of the heart-muscle. [Without accepting the hypothesis of causation, it may be noted that cardiac irregularity and deficiency of tone are very common in both neurasthenia and hysteria, and appear in many more cases than the above quotation would indicate. Valvular disability is rare.]

Féré² reports 5 cases of **neuropathic hydrarthrosis** characterized by intermittent and, in some instances, regularly periodic attacks of swelling of one or several joints, generally without fever and without any local sign of inflammation. In the intervals the joints are quite healthy, distinguished thereby from other forms of joint-disease and chronic articular affections. The knee is the joint most frequently attacked, usually alone, occasionally in conjunction with other joints; but all joints may be affected simultaneously or successively. The affection is a mild one, although there may be considerable joint-distention, and there is but little pain. Of the cases studied, 3 occurred with hysteria, 1 with epilepsy, and 1 in parietic dementia.

Fatigue-neuroses.—E. W. Wright³ calls attention to a number of cases of **readers' cramp**, in which the ocular muscles present a cramp or spasm after continuous use in reading, and believes it analogous to writers' cramp.

Flörshiem,⁴ under the term **epicondylalgia**, again describes a painful affection located in the region of the epicondyle of the humerus, radiating over the outer surface of the forearm and hand, and impeding movements of this portion of the extremity. It is manifested mainly at the time of voluntary movement, and disappears or subsides during repose. It is analogous to professional cramps, and has these 3 principal points of importance: (1) A bony pain, with a point of tenderness that has to be sought for; (2) a muscular pain, affecting the muscles that extend the forearm and are antagonistic to those of prehension in the hand, usually developed upon willed movements; (3) impaired functional power. Although Flörshiem insists that there are no other physical signs, such as deformity, redness, swelling, or paralysis, cases have been reported in which these features were noted, as in one recently by Moyer, of Chicago. Flörshiem attributes the tension to the teno-synovitis, but apparently inflammation of the muscular tissue may be added. The condition is due to overuse of certain muscle-groups.

Vigeroux⁵ claims to have found changes in the nerves and muscles in many cases of fatigue-neuroses, and concludes that they are present in all, but often so slightly as to be difficult of demonstration. He attributes very much importance to the general condition of the patient, and believes that lithiasis is at the bottom of most cases. In the treatment of the disease he finds Jackson's exercises of considerable value.

Tic.—Joseph Collins⁶ takes up the discussion of the tic-disease, and very clearly discusses the entire matter. He classifies tics as senile and early, the latter being divided into two varieties, degenerative and acquired. It is the second division, the early tics, to which the article is mainly devoted, and he

¹ Münch. klin. Woch., 1897.

³ N. Y. Med. Jour., Sept. 11, 1897.

⁵ Progrès méd., quoted by the Am. Medico-Surg. Bull., Jan. 25, 1897.

⁶ Med. News, Dec. 11, 1897.

² Rev. de Chir., July, 1898.

⁴ Jour. des Prat., Sept. 4, 1897.

divides these, first, into motor tic, embracing localized and generalized tics, and, second, psychomotor tics, which may be further divided, first, into a tic which is a response to a compulsory idea, and, second, a tic caused by coördinate movement associated with intellectual or emotional externalization, either orderly or disorderly. He points out that tic is never a chorea. It is absolutely different from Sydenham's disease. It embraces the jumpers of New England and Canada, the myriachit of Siberia, the latah of Africa, and the psychomotor tics of this country. A number of cases are given, interesting in themselves, several showing a tendency to a repetition of idea and the vocal expression of obsession. The great majority of tiquers show numerous stigmata of degeneration; and the tic may in a sense be considered such a stigma, being analogous to hysteria and epilepsy. [Not enough weight is laid upon the invariable mental element in tics. Whether they be psychomotor, purely motor, or otherwise, a tic invariably contains within itself the manifestation of purpose, or of other mental action.]

John D. Gimlette¹ describes several cases of **latah** observed in India, and calls attention to the varieties of this disease as observed in different countries. He says: "It seems to differ from the 'latak' mentioned in Quain's *Dictionary of Medicine* and the 'lata' or 'délire à Java' noted by Bordier, in not being distinctly epidemic. The varieties are, however, manifestly akin. Besides its identity with the 'tara' of Siberia, it seems indeed to share an affinity with the emotional diseases of most other countries: for example, with those of Griqualand, Norway, and Iceland, and with the 'ramaninjana' of Madagascar, the 'jumping-disease' of North America, and the 'shaking-disease.' In the Malay Confederate States cases are more evident in certain districts, such as Kedah, than in other parts, such as Perak. On the whole, it is not rare."

E. Feindel² reports treatment of a number of cases of **mental torticollis** by suggestion and exercises, both of which were accomplished with a perimeter. The patient's attention was firmly fixed upon the tests for the color-field, and thereby through the general support supplied by the instrument the torticollis was admirably inhibited. Attention once having been called to the temporary improvement produced by this method, the patient's courage grew, and under fostering suggestion—in a waking state, of course—the torticollis tended to disappear. A number of cases, with satisfactory results, are reported. [A case has been seen in which exercise of the eyes with prisms for alleged heterophoria, and with one or two ocular-muscle tenotomies, also resulted favorably. The operations and the exercises were instituted with a full understanding of their mental value, and the patient's expectation of improvement was fully realized in the course of events.]

Stammering.—G. H. Makuen³ reports on 200 cases of speech-defect treated at the Philadelphia Polyclinic Hospital. Treatment consisted in a systematic course of training designed to break up certain faulty mental and physical processes, and to substitute for them other physiologic and natural ones, governed entirely by consciousness. The patient is taught the exact sounds of the language and the speech-muscles are trained into right action by frequent repetition of proper exercises. With this goes the building up of confidence, so that the patient is convinced that he can say some things without stammering sometimes, and then that he can say anything without stammering sometimes, and finally, by repetition and encouragement or suggestion, he is brought to the point where he knows he can enunciate without stammering at all times and under all circumstances. Of the 200 cases, 95% were males. 32%

¹ Brit. Med. Jour., Aug. 1, 1897.

² Nouv. Icon. de la Salpêtr., Nov., 1897.

³ Therap. Gaz., Sept. 15, 1897.

were reported to have stammered from the inception of speech; 52% began between the ages of 3 and 10. 17% were improved; 25% were getting worse. 30% had associated with persons similarly afflicted; 32% had relatives who stammered. 17% ascribed the origin of their trouble to mimicry of others; 15% to fright; 8% to injury; and 6% to having been ill used. The patients, as a rule, presented a peculiar physiognomy which is almost characteristic. There is a dejected facial expression, probably largely due to the mental depression which many of them experience on account of their defect. The general contour of the head and face suggest the degenerate type. There is usually an entire lack of voluntary respiratory control, though the chest-contour is usually fairly good. Four cases presented shortness of the geniohyoglossus, etc., requiring operation for tongue-tie. There were 8 bifid uvulas, and many cases in which the uvula turned at right angles upon itself. In one case there was a large congenital perforation of the anterior palatal fold; another had a long epiglottis. Hypertrophied faucial and pharyngeal tonsils and intranasal lesions were generally met with, and a catarrhal condition of the nose and throat was the rule. This was attributed to the unnatural use of the organs in part; but its chief cause was intranasal pressure and hypertrophied pharyngeal and faucial tonsils.

Nocturnal Enuresis.—Cognetti de Martiis¹ records successful treatment in a case of nocturnal enuresis by the Fiorani method. The patient was a man who had suffered since childhood. A string was tied to the patient's hand as he lay in bed and attached to a bag containing 50 gm. of dry sand, acting as a weight at the foot of the bed. The first night there was one involuntary urination, causing the patient to wake. The next night the weight was doubled and the patient awoke before micturition. After a few nights the patient managed without the weight, and has remained free from the disturbance. With Fiorani, Martiis believes that nocturnal incontinence is a psychic disturbance; it is, in fact, somnambulism of the bladder, comparable to ordinary somnambulism and amenable to similar treatment.

Pavor Nocturnus.—L. Braun² believes the night-terrors of children to be nothing but a manifestation of neurasthenia, and points out the neurotic character of the subjects of these disturbances, as well as the usual presence of neurasthenia or hysteria, and thinks the treatment should be the same as for these neuroses.

Angioneurotic Edema of the Tongue.—Robert Lewis, Jr.,³ reports the case of a German woman in whom the use of chromic acid, for middle-ear disease, twice caused angioneurotic swelling of the tongue. Previous to the first attack of glossal swelling the woman gave no history of any such disturbance; but subsequently, on various occasions, she developed edema in the hands and feet, but no return of the swelling of the tongue. The author traces the swelling in the tongue to the vasomotor control of the chorda tympani, which may have been directly disturbed by the application to the middle ear.

Migraine.—Wilfred Harris,⁴ in discussing hemianopia, reports 4 patients subject to migraine, who had among them 11 attacks of transient hemianopia, each attack lasting several hours and generally accompanied by unilateral convulsions. These cases, he thinks, furnish a further evidence of the relationship between **epilepsy and migraine**. In a study of such temporary cases of hemianopia he found that the dividing-line passed exactly through the fixing-points, and did not show the indenture which ordinarily appears in

¹ *Puglia Medica*, iii., 5.

² *N. Y. Med. Jour.*, Oct. 9, 1897.

³ *Jahrb. f. Kinderh.*, 1898.

⁴ *Brain*, 1897.

chronic cases. He also finds that it may occur as a temporary phenomenon in hysteria; that quadrant defects in the field are strongly suggestive of cortical lesion, but may be sometimes due to one in the internal capsule; and, further, that the macula is supplied exactly as the rest of the retina, each side to the corresponding half-brain. In all cases of absolute transient hemianopia the dividing-line invariably passes through the fixation-point. He would explain the indenture which is found in cases of long standing by the supposition that the cortical center for the macular region is less liable to destruction than the rest of the half-vision center, and that it may also be accounted for there by the escape of the cortical center of the macula or by the acquirement by education of a new fixation-point in the retina. He attributes the scintillating scotoma in migraine, the fortification-spectra, etc., to discharge in the half-vision center of the cuneus, and he thinks this discharge is identical with that in epilepsy.

B. K. Rachford¹ refers to his finding a poisonous amount of **paraxanthin** in the urine of subjects of migraine. This body is found only as a trace in normal urine. In more than half a hundred migrainous patients he has rarely failed to find a great excess of paraxanthin in the urine, and when only small quantities of urine were available. Not only this, but paraxanthin is not excreted in the urine of migrainous patients at any other time than during the attack, and is not found in other forms of headache. As it is not formed in the kidneys during the process of excretion, it must originate in the blood. Its exceedingly poisonous character must have an effect upon the nervous system. In a small proportion of epileptics he has also found paraxanthin in the urine after the attacks. During the past three years he has examined the urine of a large number of epileptics, and would denominate only a small proportion of them as sufferers from what he calls paraxanthin-epilepsy. In these the character of the attacks is exactly similar to that of those found in epilepsy in general. He reasserts his belief that paraxanthin is an essential factor in the production of migraine, and also in one form of epilepsy; that leukomain-poisoning, including paraxanthin, is the most important factor in the two diseases; and that their kinship largely depends upon this particular.

MENTAL DISEASES.

Treatment of Insanity.—Angelucci and Pieraccini² have made an investigation as to the advisability of **surgical treatment** in hysteria and insanity. They obtained reports of 109 cases in which ablation of the internal organs of generation was undertaken for the cure of hysteria and insanity and other neuropathic conditions. Only 17 were said to have been benefited, the remaining 92 being either affected injuriously or not at all. Insanity afterward developed in 44 of these cases, 20 of whom had suffered from hysteria before the operation, while 24 had not; 23 others who had suffered from hysteria or insanity prior to the operation were worse after it; 2 who were not previously hysteric became so; 23 who had been partly insane and partly hysteric were not affected by the operation. The authors report 6 cases of hysteria favorably influenced by suggestion and simulation of the operation. They conclude that ablation of the normal uterus and appendages should be prescribed as a cure in hysteria and insanity; that the existence of hysteria constitutes a contraindication to surgical operations for gynecologic conditions; and recommend that in cases in which all known means of combating hysteria have failed, suggestion by simulating laparotomy should be tried.

¹ Am. Jour. Med. Sci., Apr., 1898.

² Riv. Spir. di Fren., 1897.

P. Keraval¹ makes a somewhat critical review of the opinions that have been published with regard to **the bed-treatment of insanity**, without, however, drawing any conclusions from them. The quotations cover pretty much all European expressions, but we find no mention of certain admirable work done in this line in this country. On the whole, it seems to be the trend of opinion of those who have had actual experience with the plan that it is both costly and difficult; but in certain instances it is of decided advantage, particularly in taking care of demented paralytics in status, and acute cases of mania and melancholia. There are some who would do away with isolation altogether, and others would use a combined plan; while others again, including Clouston, say that the method is a return to the personal restraint processes of antiquity. Keraval says, finally, that the bed-treatment is not a methodical type of treatment; that it does not supplant isolation, but changes its aspect, rendering it more agreeable and separating the agitated from the quiet. This also is the opinion of Bechterew and Rosenbach.

Blood-pressure in Insanity.—Maurice Craig,² basing his opinion upon an investigation of the blood-pressure in a large number of cases of mental disease, reaches the following conclusions: 1. That the blood-pressure varies in different forms of insanity. 2. That the blood-pressure is raised in persons who are depressed or who are suffering from melancholia. 3. That the blood-pressure gives varied results in persons suffering from melancholia with motor excitement—so-called agitated melancholia. 4. That the blood-pressure is found to be normal upon the recovery of a patient whose blood-pressure has been raised during the period of depression. 5. That the blood-pressure is lowered in persons suffering from excitement or acute mania. 6. That the blood-pressure is found to be normal after the excitement has passed off and the patient has recovered. 7. That the blood-pressure tends to fall as the day advances, hence melancholias tend to improve and excited patients become more excited. 8. That the depression following upon an attack of acute mania is not necessarily an active depression, but rather more exhaustive in type, and that the blood-pressure in these cases may remain low until it finally returns to normal upon recovery. 9. That the blood-pressure is probably raised in stupor. 10. That the blood-pressure is not always altered in delusional insanity, except in those cases in which there is also some emotional disturbance. 11. That the blood-pressure in healthy, active, and excitable persons is low as compared with healthy but apathetic individuals. 12. That from this it would seem that the blood-pressure is chiefly affected in emotional or affective insanities in contradistinction to the effective or ideational forms of mental disorder. 13. That the blood-pressure is raised in general paralysis of the insane where there is depression; whereas in the excited types of this disease the blood-pressure is low, as it is also in the later stages of all types. 14. That there is evidence to prove that the altered blood-pressure may in certain individuals induce mental aberration, but that it is so far not complete enough to enable him to state definitely that mental disease is usually caused by altered blood-pressure. 15. That the altered blood-pressure in different forms of insanity suggests the line of treatment which may be adopted in the various kinds of mental diseases. 16. That the feeling of weight and pressure upon the top of the head, so common a symptom in melancholia, is apparently vascular in origin, and is lessened or disappears when the blood-pressure is lowered. 17. That certain depressed patients improve with nitroglycerin, but that there is difficulty in keeping the blood-pressure down with this drug, as its action is so evanescent. 18. That the action of erythrol tetranitrate is more prolonged and reliable and is more

¹ Progrès méd., June 18, 1898.

² Lancet, June 25, 1898.

powerful in lowering the blood-pressure in melancholia than is nitroglycerin. 19. That the prolonged bath raises the blood-pressure, and, hence, is of more value in the treatment of excited patients.

Mental Symptoms Occurring in Bodily Diseases.—E. S. Reynolds¹ finds pleasurable feelings to be common in phthisical patients, and temporarily also from alcohol, opium, chloroform, and cannabis indica. Mental depression he finds usually accompanies abdominal diseases, rheumatism, influenza, oxaluria, phosphaturia, interparoxysmal states of epilepsy, alcoholic paralysis, and movable kidney. Mental dulness is observed in various cerebral conditions, disorders of the liver, cancer of the stomach, and before death. Irritability he finds in sick children, in adult phthisis and diabetes, dyspepsia, and gout. Hemiplegics are usually sane, and left-sided hemiplegics are more likely to be so than those in whom the right side is affected. Aphasia must not be confounded with insanity. Chronic spinal disease rarely shows mental symptoms. Valvular heart-disease may produce insanity, though not any special form. He has seen two cases of acute mania in late stages of gouty kidney. In diseases caused by germ-infections he thinks there is a large amount of insanity. After pneumonia he notes frequent cases of a mild, recoverable form. After influenza and typhoid, mania or melancholia may occur. He regards it proved that insanity predisposes to phthisis rather than that phthisis induces insanity.

Influence of Physical upon Mental Disease.—W. J. H. Haslett² takes up this interesting subject, to which he frankly admits he is able to add very little. He discusses the influence of acute infections, traumatism, and other physical diseases upon the course of insanity, and reaches these conclusions: "That febrile, suppurating, painful, and acute diseases are most likely to produce benefit; particularly boils, carbuncles, erysipelas, and some of the specific fevers; that protracted and debilitating and wasting diseases, producing anemia and loss of blood, rarely produce any mental improvement; that the purely convulsive neuroses are rarely capable of any amelioration in this way; that stuporose mental states and the second stage of acute attacks are most readily influenced for good; lastly, that the evidence chiefly points to the influence being produced by unwonted afferent impulses produced by abnormal peripheral irritation."

Paretic Dementia.—Sarbo³ records 2 cases of pruritus in this disease, and discusses the **skin-symptoms** which may be encountered. The skin-symptoms, according to Sarbo, differ from those of tabes and of the peripheral nerves in 3 respects: They lead to scratching instead of rubbing; they are not associated with other cutaneous lesions; they are general and not localized. The pruritus also tends to disappear as the functions of the cortex are extinguished, which leads the author to conclude that pruritus without other skin-changes may be a prodromal symptom of general paralysis, and is to be regarded as a projected sensation originating in a cortical lesion.

W. W. Godding⁴ gives great importance to the **use of the wet pack** in the treatment of general paresis, and details a number of cases in which improvement followed its employment. The pack is followed by massage and sometimes by a brief douche. The pack is accompanied by cold to the head in the form of an ice-bag or wet towel, and its duration is from one to three hours daily. The author thinks that through its stimulating action the heart is strengthened and the vasomotor condition improved. The heart is relieved and capillary engorgement is reduced, hyperemia of the internal organs is

¹ Jour. Ment. Sci., Jan., 1896.

³ Pester Med.-Chir. Presse, 1897.

² Brit. Med. Jour., Sept. 25, 1897.

⁴ Brit. Med. Jour., Nov. 13, 1897.

lessened, and cerebral hyperemia is improved. The whole number of cases treated was 10; 3 are dead and 7 still alive. Complete arrest occurred in 2 of these, marked improvement in 2, some improvement in 2, and no improvement in 1. At the International Congress of Medicine at Moscow, in 1897, Krafft-Ebing¹ reported 8 cases of paretics, advanced to a hopeless stage, inoculated with fresh secretion from a chancre and kept under close observation for 180 days. In none of the 8 were there any syphilitic lesions; and the conclusion is that they were all latent syphilitics, and hence immune. In none of these cases thus heroically tested had any primary manifestations of syphilis been observed. Krafft-Ebing also referred to the fact of the invariable presence of congenital syphilis in juvenile cases. He stated that the chief causes of the disease were civilization and syphilization, but believes that it is invariably of **luetie origin**.

Amaurotic Family Idiocy.—C. P. Pinckard² reports a case that is classed under this head. It was the only child of healthy, untainted Jewish parents, married but 2 years, and no family history antedated the instance in question. About the age of 6 months weakness of the muscles of the neck and a tendency to failure of sight were noticed. The extremities were not affected at the time of the report. On examination with the ophthalmoscope marked macular changes were detected, slightly more marked in the right eye than in the left. Surrounding the macula was a white patch, in the center of which was a spot of brownish-red color, suggesting somewhat the appearance of central embolism; but the edge of the patch was sharply defined, and the central red spot was larger and deeper colored than in embolism. The vessels were of a normal size and color and the nerve still of a pinkish tint. Frederick Peterson³ reported before the American Neurologic Association, May 29, a case of amaurotic family idiocy, with autopsy, in which the brain showed macroscopically and microscopically a condition of defective development. Autopsies in several instances showed that the pathologic conditions were limited to the nerve-cells of the cortex and medulla, which were found deficient in number and development. At the same meeting William Hirsh presented the results of a careful examination of a case of this disease, in which he proved nervous cellular changes not only in the brain, cortex, and medulla, but throughout the spinal cord. He is disinclined to look upon these changes as congenital, but believes them to be acquired, and suggested that it might be a toxic effect, attributable possibly to the mother's milk. In the discussion of these papers Sachs pointed out that some of his early cases were bottle-fed, and insisted, as did Peterson and others, upon the fact that the appearance of the disease a few months subsequent to birth does not destroy the assertion of its being congenital. He further pointed out that cessation of development would necessarily be followed by degeneration, and the interpretations of all observers could be harmonized.

Melancholia.—C. M. Hibbard⁴ concludes a paper upon the study of the excretion of urea and uric acid in melancholia and in cases presenting recurrent periods of confusion and depression. His conclusions are: 1. The amounts of urine and solids are generally diminished, and they usually increase with the patient's improvement. 2. The specific gravity is normal. 3. The urea and uric acid are, as a rule, diminished. 4. The diminution in nitrogenous excretions is due in most cases to a diminished ingestion of proteids; but in some instances it may possibly result from a lessened absorption of food. 5. The ratio of uric acid to urea shows no constant relation to the mental condition.

¹ Am. Jour. Insanity, Jan., 1898.

² Medicine, May, 1898.

³ Jour. Nerv. and Ment. Dis., July, 1898.

⁴ Am. Jour. Insanity, Apr., 1898.

A Case of Melancholia, with Hallucinations of Hearing, Cured by Operative Treatment.—Street and Harrison¹ report a case in which the patient had for 2 years suffered from hallucinations of hearing, which led to depression, sleeplessness, and drink. The voices heard were those of friends far away, and goaded him to destroy himself to avoid disgrace. There was constant left-sided headache, and the patient had once attempted suicide by cutting his throat. A large trephine-opening on the left side, over the center for hearing, was made and a serous cyst discovered, which was drained. The patient is reported to have made a complete recovery.

Katatonía.—F. Peterson and C. H. Langdon² give the history of cases which would ordinarily be classed under the katatonía of Kahlbaum; but after carefully considering the various features and going over the study of the subject generally they reach these conclusions: 1. Katatonía is not a distinct form of insanity; not a clinical entity. 2. There is no true cyclic character in its manifestations; hence it cannot be properly classed as a form of circular insanity. 3. It is simply a type of melancholia. 4. It is not desirable, therefore, to retain the name of katatonía. 5. The terms "katatonic melancholia" and "katatonic syndrome" may be usefully retained as descriptive of melancholia with cataleptic symptoms, verbigeration, and rhythmic movements, but should be strictly limited to this symptom-complex. 6. The prognosis in melancholia with katatonic symptoms is more grave than in any other form. 7. The treatment of the katatonic syndrome is the same as for other types of melancholia.

Transitory Frenzy.—C. P. Bancroft³ relates at length 2 cases of homicidal amnesic transitory frenzy. In both cases there was in the act internal evidence of its insane character; it was automatic and probably unconscious, and in each case was preceded by other evidence of mental disturbance.

Dementia.—W. L. Babcock⁴ makes a careful report on the subject of loss of brain-weight in conditions marked by dementia, and draws the following conclusions: 1. The rate of loss in brain-weight in chronic insanity is dependent upon the *duration* of the dementia. 2. The onset of senility is attended with an increased loss in the brain-weight. 3. The pathologic evidence of incipient dementia (beginning loss of brain-weight) suggests that the onset of chronicity occurs at an earlier period of a psychosis than the clinical symptoms would lead us to believe.

¹ Liverpool Med.-Chir. Jour., July, 1897.

² Med. Rec., Oct. 2, 1897.

³ Boston M. and S. Jour., Oct. 14, 1897.

⁴ Phila. Med. Jour., June 18, 1898.

ORTHOPEDIC SURGERY.

BY VIRGIL P. GIBNEY, M. D., AND J. HILTON WATERMAN, M. D.,
OF NEW YORK.

Introductory Resume.—During the past year very little original investigation has been made in orthopedic surgery. But few new books have been published, and what has been written is mostly in the line of further research in diseases which have long since been recognized. The current literature has contained a great deal in reference to the forcible correction of the deformity in Pott's disease. In our judgment, it is a problem which needs further consideration, and will require many years of observation and practical experience before we will be able to determine the actual scientific value of this method. However, it may be definitely stated that it has demonstrated that an ambulatory apparatus can be applied which will support a vertebral column when the bodies of the vertebrae do not exist, but where the gap is only bridged over. J. E. Moore has written a *Text-Book on Orthopedic Surgery*, embodying the entire subject. He devotes a great deal of attention to Pott's disease, and the chapter on this disease is excellently written and contains some fair illustrations. We regret that many forms of apparatus which are recommended by the author as adapted to the wants of the general practitioner are, in our opinion, those requiring the skill and constant attention of surgeons particularly familiar with orthopedics. Opinions in regard to treatment are based, in most instances, on the personal experience of the author, and many valuable suggestions are given. Although the methods of others are frequently referred to, they are not considered in detail. The majority of the 177 illustrations are excellent. N. M. Shaffer has contributed some essays on orthopedic surgery, in which are considered its present status, a definition of orthopedic surgery, its scope, its relation to general surgery, its present needs and future demands. The author would have the orthopedic surgeon restrict himself to those cases in which mechanical treatment forms an essential feature. We think that most practitioners will be uninfluenced by such advice, and will be broader-minded in this specialty. J. K. Young has collected most of the writings of the late A. Sydney Roberts. They are published in the form of a memoir, as a debt of gratitude to the distinguished surgeon. A biographical sketch is given in the introduction. G. A. Bannatyne, in an excellent monograph, considers rheumatism in all its details. Many theses and monographs have been written, which we regret we are unable to review, as space cannot be obtained in the present volume. Among them are some by W. Anderson, *Deformities of the Fingers and Toes*; Henri Lenail, *Des Luxations des Cartilages semilunaires du Genou, et en particulier de leur Traitement par l'Excision*; P. Redard, *Le Torticollis et son Traitement*; O. Vulpius, *Aus der orthopädisch-chirurgischen Praxis*; A. Schlesinger, *Die Pathogenese der Muskelatrophie nach Gelenkerkrankungen*; and J. Etcheverry, *De la Greffe autoplastique suivant la Méthode italienne modifiée dans les Ulcères et pertes de Substance étendues du Talon et des an-de-pied. Récupération de la Fonction*. The volume of *Transac-*

tions of the American Orthopedic Association for 1898 is very complete and contains much valuable information, which we have endeavored to consider fully in the sections that follow, as well as the current literature for the past year.

DISEASES OF THE SPINE AND THORAX.

Immediate Reduction of the Angular Deformity of Spinal Caries.—A. H. Tubby and Robert Jones¹ present a very fair *résumé* of this subject from personal experience. They have come to the conclusion that the method is still on trial as to its ultimate results, and it seems to afford a good prospect of reducing the deformity without incurring dangerous consequences. This statement may be regarded as purely preliminary. In an article published 6 months later Tubby states that in suitable cases the method holds out a good prospect of cure, with a straight spine. The great risk is that the method may be adopted in unsuitable cases, in which event discredit will be thrown upon the procedure.

R. W. Lovett² has reviewed the recent literature on this subject and reported the results obtained by various writers, as well as stating the objections offered to this method of forcible reduction. The general opinion is that the question of bony repair of the gap in the vertebræ is still under consideration, as we have not as yet reached a definite conclusion. Dueroquet has shown radiographs which are said to illustrate bony repair in the gap of the vertebral bodies. Unless this can be conclusively demonstrated, the operation of wiring the spinous processes, as suggested by Chipault, will be finally advocated. Chipault claims that all cases will lapse unless the apophyses are fastened together. Malherbe has reported a case in which fracture of the spine resulted from attempts at correction. Caleb has reported 204 favorable corrections, with brilliant ultimate results. Among those who have reported relapses are Péan, Phocas, Tausch, Lorenz, and Vincent. The writer concludes that it is impossible to state at the present time what cases are best suited for operation, except that they must be without ankylosis.

Spondylolisthesis.—R. W. Smith³ adds to the literature of this subject a very interesting case, which was treated by fixation, as the symptoms presented were much like those in lumbar Pott's disease. The patient's recovery was excellent and there was disappearance of notable disability, although the characteristic deformity was but slightly diminished.

Lateral Curvature of the Spine; 1000 Cases.—Bernard Roth⁴ has analyzed the number of cases which he has treated by posture and exercise, and without the use of mechanical supports. The average age at which the deformity began was a little over 12 years; more than half the cases developing it between 10 and 15 years. In 231 cases of the series no assignable cause could be found. A very small percentage of the cases was attributable to rickets, due to the fact that they were chiefly from the wealthy classes. The author classifies the degree of osseous deformity as extreme, severe, moderate, and a trace. If the ribs posteriorly and the erectors spinæ were perfectly symmetrical when the trunk was well flexed, absence of osseous deformity was diagnosed. It is interesting to note that there were only 79 without definite osseous deformity. By the method of treatment used, 869 were much improved and 75 improved; in the latter, pain persisted more or less. He reports 5.6% failures, which he attributes to want of intelligence or perseverance in the patients themselves. [We think it doubtful if the meas-

¹ Brit. Med. Jour., Aug. 7, 1897.

² Boston M. and S. Jour., Mar., 1898.

³ Tr. Am. Orthoped. Assoc., 1897.

⁴ Brit. Med. Jour., Oct. 9, 1897.

urements are reliable, except at the observations. Pain is a very rare symptom in this country. Advanced cases and stupid patients must be treated by attempts at forcible correction and retention by plaster.]

A New Instrument for the Measurement of Spinal Curvatures.—Tait McKenzie¹ has described a new instrument for this purpose, which records in inches or centimeters the difference in level of the shoulders, of the points of the scapula, and of the iliac crests, as well as measuring the deviation of the spinous processes at all levels, and measures the amount and shows the nature of the rotation when present. In order to take a tracing the spinous processes are first marked with a black pencil, and the patient is then placed upon the stand.

Advantages and Disadvantages of Certain Forms of Support in the Treatment of Spinal Curvature.—Noble Smith,² in a lecture delivered at the City Orthopedic Hospital, remarks that the plastic felt jackets which are so commonly used when a support is required press on the chest, but do little toward holding back the shoulders; they interfere with the use of the muscles, and fail to give efficient support. Instead, he advises the use of the adaptable metal splint, which he claims has the advantage of developing the chest without pressing upon it. It claims to prevent the spine from falling into bad positions, forms a fixed basis from which to apply pressure upon lateral curves, and is made of steel, the lightest material for the purpose, enabling the surgeon to examine the patient while the apparatus is *in situ*.

Resection of Vertebrae for Pressure-paralysis from Spondylitis.—Hans Wachenhausen,³ who has done considerable experimental work on this subject, gives the indications for operation in these cases as follows: The progress of the disease; prolonged use of orthopedic apparatus without improvement; impaired sensation and motion, which is steadily growing worse; and increasing bladder-symptoms. An operation is contraindicated in general tuberculosis and when the vitality is greatly lowered. Of 36 operated cases, the results were good in 15. The best results were obtained in children.

Pathology in its Relation to Orthopedic Surgery.—R. W. Lovett⁴ believes that there are few problems in surgery or medicine more interesting or more in need of investigation than those which lie at the root of many conditions which, as orthopedic surgeons, we constantly meet. Some of these are conditions which in certain aspects attract the attention of the general surgeon or the physician or neurologist; others depend almost wholly upon ourselves for their elucidation. He makes an earnest plea for more work in the lines of pathologic investigation.

Treatment of Pott's Disease with Sublimate.—Capparini⁵ has succeeded in gradually improving and curing the paralysis and pain in 3 cases of Pott's disease by a daily subcutaneous injection of 10 cgm. of sublimate. In 2 months the first case was able to walk. The author states that none was syphilitic.

Spinal Caries, with Suppuration and Discharge through a Bronchus.—J. E. Goldthwaite⁶ reports a case presenting this unusual condition, a boy, 14 years of age, with recurring spinal trouble. The disease began when he was 18 months old, and when 6 years of age he was again under treatment. Ten weeks before the suppuration there was difficulty in breathing and epigastric pain. Then an abscess formed in the back on the left

¹ Brit. Med. Jour., Oct. 9, 1897.

² Ann. of Surg., Sept., 1897.

³ Jour. Am. Med. Assoc., Jan. 29, 1898.

⁴ Lancet, Oct. 16, 1897.

⁵ Boston M. and S. Jour., May 19, 1898.

⁶ Ann. of Gyn. and Pediat., Apr., 1898.

side, just below the ribs. Careful examination excluded all other localities as its source, showing that the abscess must have been in the mediastinum.

Head-support for Caries of the Spine.—E. B. Young¹ presents a head-support for this condition, the construction of which is shown in Fig. 62.

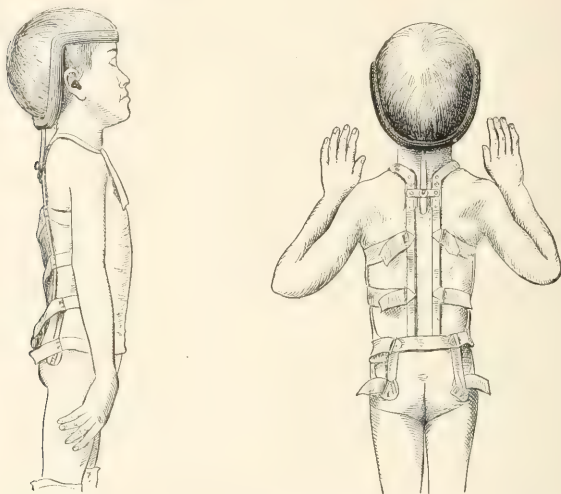


FIG. 62.—A new head-support for caries of the spine (E. B. Young, in Boston M. and S. Jour.).

He states that, with the exception of children with large parietal bosses, or where there is a lack of intelligent care, it is suitable for all cases of spinal caries. The particular advantage claimed is that it allows freedom of motion of the jaw.

Hydatids of the Spine.—S. Lloyd² reports a case occurring in a patient in whom there had been a distinct kyphosis simulating tuberculous disease of the spine. Later the patient developed a marked curvature; and it was not until the development of a tumor that the true cause of this was recognized. After removal of the tumor the symptoms disappeared. Some months afterward the patient died from injury received in an accident. The autopsy showed the part operated upon to be free from hydatids, but 2 small cysts were found in the cauda equina.

Bivalve Plastic Splint.—H. L. Taylor³ presents a bivalve splint for the treatment of Pott's disease. As shown in Fig. 63, the ordinary jacket is cut down in each axillary line so that it is divided into an anterior and a posterior half, each half being joined by webbing attached to buckles. A paper pattern for both the anterior and posterior valves is made from the patient's back, allowing 1 in. extra around the edge, to be folded back. Eight or ten layers of crinoline are cut of the same size and shape. The patient is then laid on a table, face downward, a support being placed under the pelvis and

¹ Boston M. and S. Jour., Jan. 20, 1898.

² Tr. N. Y. Acad. of Med., Feb., 1898.

³ Tr. Am. Orthoped. Assoc., 1898.

sternum, the crinoline sheets are dipped into plaster-cream, and the whole carefully moulded to the patient.

Growth in Spondylitics.—H. L. Taylor,¹ in an excellent article on this subject, points out that the growth-curves of patients treated early show more progress than those of patients whose treatment was delayed. Strictness and laxity of treatment are plainly registered in the curves. Disease of the cervical region affects growth the least; diseases of the dorsal, especially the

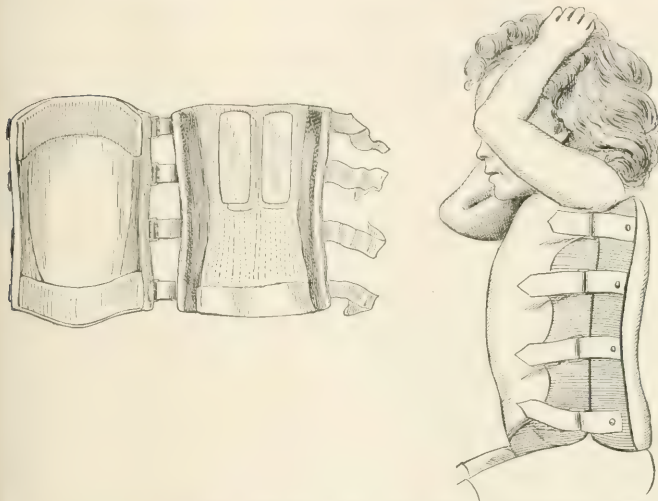


FIG. 63.—A bivalve plastic splint for Pott's disease (H. L. Taylor, in Tr. Am. Orthoped. Assoc., 1898).

lower half, the most; while disease of the lumbar region occupies an intermediate position. He regards an average annual growth of 1 to 1½ in., extending over a period of years, as satisfactory. The resulting dwarfing in girls under unfavorable conditions was more extreme than in boys. [We agree with the author that lead-tape tracings of the spinal contour give perhaps the most exact knowledge obtainable of a patient's progress, and are indispensable for recording the results of treatment.]

Some Deformities of the Chest in the Light of its Ancestry and Development.—Woods Hutchinson² has classified the chest as (1) the quadruple chest, in which there is great anteroposterior development; and (2) the chest in which the lateral expansion increased at the expense of the anteroposterior development. He explains the development of the chest of lateral expansion as resulting from man and his nearer ancestry assuming the upright position and swinging by the arms. In chests showing a tendency to become diseased the ancestral type predominates. Reversion to the primitive type under circumstances not suitable to it was the starting-point for disease.

Congenital Absence of the Pectoral Muscle.—H. L. Taylor,³ at a

¹ N. Y. Med. Jour., Oct. 8, 1898.

² Med. Rec., July 10, 1897.

³ N. Y. Polyclinic, Mar. 15, 1898.

meeting of the Orthopedic Section of the New York Academy of Medicine, presented a patient who had been brought to him because of the asymmetry of the upper part of the chest in front. There was a marked depression on the left side where the pectoralis major should have been. Sayre and Whitman reported similar cases which they had seen. [We believe this condition to be extremely rare, and congratulate the writer on his contribution to the study of thoracic deformities.]

DISEASES OF THE HEAD AND NECK.

The Cervical and Thoracic Nerve-roots in Relation to Wry-neck.—J. S. Risien Russell¹ presents the results of his experimental investigation on this subject. If borne out by facts, they place an entirely new aspect on the treatment of this condition. The experiments have been conducted on monkeys. The first point investigated was the position assumed by the head on excitation of the motor portions of the individual cervical and thoracic roots. In some instances a given root was excited and all the muscles which responded were noted; while in other instances a given muscle was kept under observation while each nerve-root of the series investigated was in turn excited. It was found that the individual variation was considerably more in the nerve-root supply of the muscles of the neck than in those of the limbs. The experiments were carried out in detail, and the writer finds that they have a practical bearing on the results of the treatment of wry-neck, in that a knowledge of the precise muscles innervated by a given nerve-root cannot fail to be of great advantage in any consideration as to the nerve-roots, division of which is most likely to be attended with the relief of spasm. The results obtained point clearly to the fact that in the most common forms of torticollis surgical treatment must be directed chiefly to one or all of the four upper cervical nerve-roots, as being the only procedure which offers a reasonable prospect of permanent relief. In lateral inclination of the head, by which the shoulder and side of the head and face are approximated, attention should be directed to the first and second cervical nerve-roots; while in those instances in which the chief movement of the head is one in which the occiput is drawn backward, the third and fourth cervical nerve-roots should receive attention. [The result of this investigation has by no means been proved as yet to be of practical value; further research is needed on this subject, which has been ably presented. Excision of the posterior branches of the first 4 cervical nerves was first done by Noble Smith, in 1890.]

Spasmodic Torticollis Treated with Thyroid Extract.—H. H. P. Cotten² reports a case cured by the administration of thyroid extract. He began by giving 10-minim doses 3 times a day, which is equal to about one average-sized gland. He increased the quantity given, and after the patient had taken about 2 oz. of the extract he was practically well, only occasionally complaining of very slight neuralgia in the neck and shoulder.

DISEASES OF THE HIP.

Congenital Dislocation.—Noble Smith³ advocates in certain cases the mechanical treatment of congenital dislocation. Where the false joints are firm he has restricted the treatment to counteracting the tilting of the pelvis and the consequent lordosis. He states, furthermore, that by prevention

¹ Brit. Med. Jour., Oct. 23, 1897.

² Ibid., July 24, 1897.

³ Ibid., Nov. 6, 1897.

or limitation of the lordosis by mechanical means, great improvement in the position of the spine may be effected; it gives much comfort to the patient and improves very greatly the powers of walking. In the course of time the lordosis may be often almost entirely overcome by this treatment. The apparatus, which is merely supplemental to that suggested by Buckmeister Brown, consists of a metal girdle to press the head of the femur inward. [The method as described fails to carry conviction. We do not present it as new, but merely as worthy of further test, inasmuch as Noble Smith claims good results. In our own experience lordosis is not easily corrected by any mechanical devices; and even if it were corrected, we fail to see how the gait would be improved. So long as the dislocation continues and so long as section of the shaft immediately below the neck is not made, the correction of the lordosis must of necessity make the patient more unsteady in posture and gait. These are theoretical objections, and should not stand in the way of clinical facts.]

The Treatment of Hip-joint Disease.—M. Berger,¹ at a recent meeting of the Société de Chirurgie, said that he had employed in the abscesses of coxalgia injections of iodoform and ether and of camphorated naphthol, with satisfactory results. He recognizes two forms of abscess: That which is observed toward the end of the disease, after the removal of the dressings, which was easily cured by injections; and that which was observed when the disease was at its height, when injections were of no avail. [The former is the common "cold abscess" with which all are familiar, and yet is not easily recognized. The "complete arrest of disease" is far from easy to diagnose; hence the author's alleged distinction is, in our opinion, of little value clinically. Reference, therefore, is made to this article chiefly to call attention to the problem involved and to throw discredit on such therapeutic means of differentiation.]

Abscesses, with Perforation of the Bladder.—T. H. Myers² related a very interesting case, before the Orthopedic Section of the New York Academy of Medicine, in a boy, 10 years of age, who had left hip-disease with many sinuses and waxy liver. A discharge of urine from a sinus in the inguinal region continued for 2 weeks. Examination of the urine showed a specific gravity of 1010, no pus, hyaline and granular casts, and a few pus-cells attached to casts. He related another case in which an abscess appeared above Poupart's ligament in the right side. Large quantities of pus were painfully passed with the urine.

Chronic Joint-disease in Children.—Still³ published an interesting article on a form of chronic joint-disease which hitherto has not been generally recognized. The characteristics of the disease are progressive enlargements of the joints, associated with general enlargement of the glands and enlargement of the spleen. While acknowledging that rheumatoid arthritis occasionally occurs in children, he believes that the disease which has most commonly been called rheumatoid arthritis in children differs both in its clinical aspect and in its morbid anatomy from the rheumatoid arthritis of adults. It presents differences sufficiently marked to suggest that it has a distinct pathology. His article is based on a study of 22 cases.

Resections in Hip-joint Disease.—Lovett,⁴ in a paper with this title, comes to the conclusion that the indications for resection are: (1) Persistent deterioration of the general condition; (2) a progressive process in the joint,

¹ Gaz. hebdom. de Méd. et de Chir., July, 1897.

² Tr. N. Y. Acad. of Med., Jan., 1898.

³ Am. Jour. Med. Sci., Oct., 1897.

⁴ Tr. Am. Orthoped. Assoc., Oct., 1897.

as shown by much induration and discharging sinuses; (3) failure to relieve the acute symptoms by efficient apparatus; and (4) the formation of extensive sequestra in the joint. [Many surgeons lay great stress on the first indication mentioned, and agree that in most instances the poor results obtained are due to our custom to operate comparatively late. However, many objections can be offered to early excision.] In his article the opinions of the surgical world are of great interest. Ollier¹ advises resection if the hip remains painful and does not tend to ankylosis, and if the acetabulum is diseased as the result of abscesses which have been opened and have recurred. Lambotte,² another recent French writer, says of excision: We are of the opinion that as soon as pus exists in the capsule, the best way of rapidly curing the patient is to resect without delay. In Germany the tide sets strongly in favor of conservatism. As Jalaquier³ has put it somewhat graphically, the Volkmanns, the Leisrinks, and the Koenigs, who were resection-mad (*atteints de résécomaine*), are now reacting and are defending conservative operations. At the German Surgical Congress in 1894, Schede, Helferich, and others advocated conservative measures.

W. R. Townsend⁴ has recorded the results of 101 cases operated upon by himself and others at the Hospital for Ruptured and Crippled, New York. Of this number, 51 have died from the diseased condition present. The cause of death in 28 was exhaustion; 9 died of tuberculous meningitis, but in only 1 instance could the operation be held responsible. Of the 47 patients that are living, 26 are cured of the disease, with varying amounts of shortening. The other 21 are in bad condition as the result of long-continued suppuration. The writer is of the opinion that excisions, to be of benefit, must be done early. He thinks that the necessity for excision will diminish as our knowledge of mechanical treatment increases.

Mechanical Treatment of Ununited Fracture of the Neck of the Femur.—Shaffer⁵ continues to advocate the use of the long hip-splint, surcingle, and tourniquet over the fragments; he reports 3 cases successfully treated, in addition to those already placed on record.

Treatment of Congenital Dislocation of the Hip by the Lorenz Method of Forcible Correction.—Whitman⁶ has reported a successful case treated by this method. He states that this operation is often confounded with the forcible correction of Paci, but that the Lorenz treatment is based upon the theory that if parts about the joint may be sufficiently stretched to permit the head of the bone to be brought into direct contact with the rudimentary acetabulum, and if it can be held in this position, the weight of the body in walking, constantly forcing the bone against the substance that partly fills it, will gradually enlarge it to its normal capacity; thus it is called the functional weighting method, and this is its essential distinction.

Congenital Dislocation of the Hip.—Mikulicz⁷ fixes the leg in the position of extension, abduction, and outward rotation, claiming that in this position the luxated head of the thigh-bone is gradually forced to the edge of the acetabulum, and as soon as the existing antagonizing power is removed it is replaced. He advises having the children spend the greater part of the day in the apparatus, as well as during the night. During the rest of the time he permits them to move about. He presented 3 cases of unilateral luxation in

¹ Résections des Grands Articulations, Paris, 1895.

² Jour. de Méd. et de Chir., Ann. iv., 3, 261.

³ Tr. Am. Orthoped. Assoc., 1897.

⁴ Am. X-ray Jour., June, 1898.

⁵ Centralbl. f. Kinderheil., i., 304, 1896; Pediatrics, vol. iv., p. 508.

⁶ Thèse d'Aq., Paris, 1886.

⁷ Ibid.

which he had obtained extraordinarily good results. The author claims that up to the second year of life the apparatus alone is usually sufficient to effect a perfect cure.

A Modification of the Hip-splint.—J. Dane¹ presents a hip-splint (Fig. 64) based on the principle of the "Thomas knee-splint," to which has been added a Burrell screw-extension, and at the top it is fitted with a pelvic band similar to that now used upon the Taylor hip-splints, but so adjusted by means of a hinge-joint that it can be carried sideways when the splint is being put on, and then locked into position by a simple key. At the bottom there is a windlass and cog-wheel, whereby traction can be made upon the ends of a plaster extension applied to the leg.

Tuberculosis or Sarcoma of Hip-joint.

—Sherman² calls attention to the difficulty in making a diagnosis between tuberculosis and sarcoma of the hip. He reported 8 cases of amputation at the joint: 4 were tuberculous and 4 sarcomatous. The differential diagnosis was only made at the time of the operation in 2 of them. One case of sarcoma is still alive 7 years after the operation. In 2 of the fatal cases the termination was strangely alike. The first showed no sign of recurrence for 14 months; then suddenly a very severe and persistent pain appeared in the right side of the chest. The chest was aspirated and a large amount of fluid withdrawn. Later a similar condition appeared on the left side, and death occurred apparently from suffocation. The autopsy showed marked sarcomatous infiltration in both lungs.

Ultimate Results of 150 Cases.

—Gibney, Waterman, and Reynolds³ report 71% of this number entirely cured. All these cases were under observation for at least 5 years. The mortality was 7½%. Death did not appear to be dependent upon operative procedures. Of the 107 cured cases, 12% have perfect motion, 20½% good motion, 37½% limited motion, and 29% ankylosis. Twenty-five cases are still under treatment—that is, they can hardly be regarded as cured at the present time. The majority of the cases were treated by fixation and traction (extension). When deformity existed this was corrected. In the 14% which were submitted to subtrochanteric osteotomy the results have been uniformly good.

Some of the Pathologic and Mechanical Problems of Hip-disease.—A. M. Phelps,⁴ at a meeting of the Orthopedic Section of the New York Academy of Medicine, presented his views on this subject. He believes that nature attempts to repair the lesion producing hip-disease by inflammatory action, which is a normal process of repair until the inoculation of germ-life, which marks the beginning of the disease in the area of inflammation. If the phagocytes are weakened by the strumous condition of the patient, they fail to destroy the germs. If, however, germ-life was destroyed, repair went on and the parts were restored to their normal condition. In the

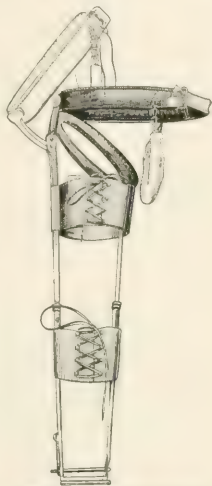


FIG. 64.—A new modification of the hip-splint (J. Dane, in Boston M. and S. Jour.).

¹ Boston M. and S. Jour., July 15, 1897.

² Ann. of Surg., Oct., 1898.

³ Phila. Med. Jour., Aug. 20, 1898.

⁴ Jour. Am. Med. Assoc., Mar., 1898.

application of mechanical treatment he advocated lateral traction in the line of the axis of the femoral neck, and not of the shaft.

DISEASES OF THE KNEE.

Operations on the Semilunar Cartilages of the Knee.—H. Marsh¹ concludes that there are 3 methods from which to choose in operating for this condition. The knee-clamp shown in Fig. 65 may be applied. For slight cases this apparatus is often adequate when worn for a year. In the more severe cases the clamp often fails to keep the cartilage in its place. The choice of operation lies between suture (Fig. 66), as originally recommended by Annandale, and removal of the portion of the cartilage which has been torn from its connections. He

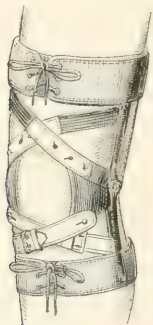


FIG. 65.—Splint for retaining in place a dislocated semilunar cartilage. The mechanism limits the movement of the joint to flexion and extension, all rotatory movement being prevented (H. Marsh, in Brit. Med. Jour.).

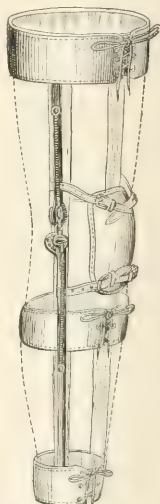


FIG. 66.—The apparatus consists of double steels on either side of the limb, extending about 9 in. above and 10 in. below the center of the knee-joint, these steels being attached by metal thigh- and leg-plates. The chief feature of the appliance is the construction of the knee-joint. This is a combination of ring-catch and regulating movement, enabling the patient to walk, first, with the leg absolutely fixed, and then increasing the movement gradually (H. Marsh, in Brit. Med. Jour.).

regards the latter as free from any appreciable risk, and from his own experience removal has not impaired the functions of the joint. In each of the 12 cases which he has operated the internal cartilage has been involved, and it has been the anterior segment that has been affected.

An Operation for Slipping Patella.—R. Whitman,² at a meeting of the Orthopedic Section of the New York Academy of Medicine, presented a case upon whom he had operated for this condition. The capsule had been divided on the outer side, and owing to the contraction of the tissues considerable difficulty was found in reducing the dislocation. A tuck was taken in the capsule on the inner side. The patella is now over the internal condyle, but when the patient left the hospital it was in the median line. This dislocation was but part of the disability and deformity attending hemiplegic contraction

¹ Brit. Med. Jour., Mar. 5, 1898.

² Boston M. and S. Jour., Jan. 13, 1898.

of the right side of the body, so that it was not presented as a fair test of the operation. [It is still a question what is the best treatment for slipping of the patella. We do not know of an operative procedure that has met all requirements. One of the writers has transplanted a fragment of the tibia with the insertion of the ligamentum patellæ in a girl 14 years old. The ultimate result is in doubt, as the patient was lost sight of.]

Fibrous Ankylosis.—At the annual meeting of the British Orthopedic Society a discussion on this subject followed. Keetby¹ described a case he had operated on, which years ago surgeons would have considered typical of fibrous ankylosis. The knee had several times been forcibly straightened with rupture of supposed adhesions, and had each time relapsed. He opened the knee-joint and found no adhesion whatever inside it, but its external parts were extremely small. He states that many cases hitherto regarded as fibrous ankylosis were really cases of movement limited by some cause external to the joint, such as malunited fracture, inflammatory deformity of bone, inflammatory adhesions (external), or nutritive shortening combined with contractions of capsule and ligaments. [Among many suggestions, one in particular is worth consideration: That instead of forcibly moving the joint in cases of ankylosis, if there was any doubt at all, the joint ought to be opened and its exact condition ascertained.]

Genu Recurvatum.—Gerhardt Marchand² publishes a rare case. The patient, a boy, aged 17, had an abscess in the right thigh when 5 years old. After profusely discharging for some time it finally closed, leaving permanent cicatrices, one superficial on the anterior surface of the thigh, the other fixed on the outer side. The deformity which developed was characterized by marked hyperextension of the right leg. When the patient was recumbent only the popliteal region touched the bed, the remaining portions of the leg being above it. The patella was fixed far above the knee, and there was atrophy of the muscles of the leg.

It appeared that the previous osteomyelitis had resulted in abnormal adhesion of the extensor muscles to the front of the femur, and that a portion of the quadriceps had been prevented from growing in the same proportion as the femur, with the result of a slowly formed hyperextension. An operation was performed with a view of separating the adherent portion of muscle from the bone. The result was very good, the limb being restored to its normal position, although some limitation of motion remained.



FIG. 67.—Position of the limbs in a case of genu recurvatum (Shield, in *Lancet*).

Marmaduke Shield³ also reports a very interesting case occurring in an infant 8 weeks old. The accompanying figure shows the position in which the legs were held. Under chloroform an attempt was made to straighten and flex the

¹ Birmingham Med. Rev., Feb., 1898.

² Rev. d'Orthop., No. 1, 1898.

³ *Lancet*, May 28, 1898.

limbs. Posterior splints were applied. Ten days later the child died, possibly from some congenital cardiac affection, although the cause of death was not clear. As the right knee-joint was the more markedly deformed, this was selected for examination. On dissection the following remarkable conditions were found: The soft parts in the popliteal space were normal, excepting that the hamstring muscles seemed stretched over the prominent condyles of the femur. The position of the bones brought the under surface of the patella to the front of the femur above the intercondyloid notch, and here a very important condition was noted. The under surface of the patella was not articular, and the tough fibrous aponeurosis was intimately adherent to the front of the femur above the intercondyloid notch, so that it could only be dissected away with difficulty. The crucial ligaments were normal in position, but seemed to be too short. The bones could not be brought into position until the capsule and lateral ligaments were cut. The articular surface of the tibia lay on the front articular surface of the femur, in the position ordinarily occupied by the patella; while the condyles of the femur projected backward into the popliteal space. It is interesting to note that the process of straightening had not really affected the relation of the articular position, but was due to a bending of the tibia at its epiphyseal junction. [Many theories as to the cause of this congenital condition in general have been advanced, but the one which at the present time seems the most plausible to us is that of injury to the mother during gestation, with consequent uterine malposition of the child. Cases of acquired genu recurvatum are not infrequently seen following the incorrect application of adhesive plasters in making traction in hip-disease; here the plasters have been applied below the bone. Then it may first show itself in the adult as the result of paralysis of the quadriceps extensor cruris from ataxia. We have found cases on record in which it occurred from destruction of the joint by disease.]

DISEASES OF THE FOOT.

Pes Valgus, Varus, and Lateral Curvature in Same Patient.—

J. R. MacMahon¹ reports an interesting case in which these three conditions were present at birth. The right leg at the hip was greatly flexed and abducted, owing to the viscera protruding from the patent abdominal wall; the knee was flexed and rotated out, and the foot held in a position of varus. The left lower extremity was flexed at the hip, and the foot in valgus deformity. The spinal column presented a lateral curvature to the right, extending from the upper dorsal region to its lower limit. The author furthermore explains what he believes to be the causative factor in producing the condition in this instance.

Calcaneo valgus with Subluxation of the Astragalus.—H. L. Taylor² presented before the Orthopedic Section of the New York Academy of Medicine a baby affected with calcaneo valgus, with an unusual degree of subluxation forward of the astragalus. The heel was very prominent. The fibula was behind its normal position.

Osteoplasty on the Foot.—Bayer³ describes an operation which Bardenheuer performed for the restoration of the 2 anterior supporting points of the foot. In the case there had been destruction of the distal portion of the first metatarsal bone, and of the proximal portion of the first phalanx of the same toe. The operation performed was the removal of the necrosed portion of bone, the cutting of the lateral ligament of the metatarsal phalangeal

¹ Brit. Med. Jour., June 18, 1898.

² Tr. N. Y. Acad. of Med., 1898.

³ Treatment, Aug. 12, 1897; Centrabl. f. Chir., Dec., 1896.

joint of the second toe, the displacement of the metatarsal bone inward, and the attachment of it to the remaining portion of the proximal phalanx of the great toe.

Practical Remarks on Shoes.—Whitman¹ published a paper in which he calls attention to the particular form of shoe which is adapted to the foot. The illustrations presented show the normal feet and the proper soles for them,



FIG. 68.—Normal feet (Whitman, in Med. News).



FIG. 69.—Proper soles for normal feet (Whitman, in Med. News).



FIG. 70.—Shoemakers' feet (Whitman, in Med. News).

as well as the soles which are commonly worn, and the rocker sole which produces such distortion. In the relation of the shoes the breadth of the sole, the angle of outward deviation of the soles when the two are placed side by side, and the capacity of the upper-leather must be the determining points. He advocates the wide Waukenphast pattern as the best form of shoe. The most effective work for reform can be accomplished by providing better shoes for children, as their feet show that atrophy and compression begin at a very early age. Mention is also made of the socks which should be worn;



FIG. 71.—Shoemakers' soles (Whitman, in Med. News).



FIG. 72.—The rocker sole (Whitman, in Med. News).

although of far less importance than the shoes, they should be sufficiently large and of a texture which adapts readily to the shape of the foot. Parker Syme² points out as the cause of bunions, shoes which are faulty in shape or are ill-fitting, and a shoe that crowds the toes together or pushes the great toe backward. Hallux valgus and hammer-toe are the more immediate results of many "fashionable shoes."

¹ Med. News, Aug. 14, 1897.

² N. Y. Med. Jour., Oct. 2, 1897.

DISEASES OF THE SHOULDERS.

Round Shoulders.—E. H. Bradford¹ states that the treatment must be continued for a long time and designed to stretch the ligament and strengthen



FIG. 73.—Waist, with shoulder-straps and side stocking-supporters attached (Bradford, in Boston M. and S. Jour.).



FIG. 74.—Skirts buttoned to waist (Bradford, in Boston M. and S. Jour.).



FIG. 75.—In raising the outstretched arms the back is arched forward in the lumbar region (Bradford, in Boston M. and S. Jour.).

the muscles involved. Proper attention to the clothing must be given. Where any weight is thrown upon the shoulders, it should be a force that pulls

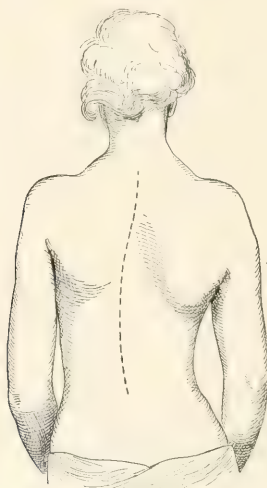


FIG. 76.—The effect of shoulder-straps upon the upper contour of the trapezius (Bradford, in Boston M. and S. Jour.).

¹ Boston M. and S. Jour., Sept. 9, 1897.

the shoulders backward. The waist should make no pressure upon the sternum. In young children the greater weight of the underwear should be borne upon the hips. Figures 73-76 explain themselves. He states that the prevention of this condition is more important than its cure.

DISEASES OF THE HAND.

Jerk-finger and Mallet-finger.—A. H. Tubby,¹ in an excellent monograph, describes these two conditions which are sufficiently rare to merit notice. He describes the former as one in which the patient can close all the fingers on the palm, but on attempting to extend them he finds that one remains more or less flexed. In some cases the flexion passes away suddenly and the fingers extend with a distinct jerk. Sometimes the fingers can be fully extended, but one of them cannot be flexed except with a sudden jerk. The digits usually affected are the thumb, the middle, and the ring-fingers. William Anderson, in his recent work, advances many views as to the pathology of this condition, but arrives at no definite conclusion. Subcutaneous rupture of the extensor tendons, or mallet-finger, is also somewhat rare. Morris states that the condition produced is a thinning of the tendon on the proximal side of the principal point of attachment to the phalanx, and of the fibers which form the posterior ligament of the last phalangeal articulation. He says that the deformity is not uncommon among men who engage in athletic sports, although the injury is seen more frequently in women, and it is by no means severe.

MISCELLANEOUS.

The Use of Combined Skin- and Bone-flaps to Remedy Large Defects in the Tibia.—A. Freiherr von Eiselberg² (Königsberg), in 2 cases in which a large portion of the tibia was absent (from trauma and disease), performed an autoplasmic operation, which is described as follows: After applying an Esmarch bandage above the point of operation, he excised the scar over the tibial defect. The end of the upper part of the bone was freshened; then he removed the malleolus of the tibia and freshened the astragalus on its upper surface. A flap containing skin, periosteum, and bone was taken from the upper fragment of the tibia; this reached to the tuberosity of the tibia. The bone was then divided. The flap was twisted on its pedicle, through an angle of 180 degrees, and its free margins sutured to those of the defect. The transplanted bone increased in size and strength, and there was no shortening. An excellent result followed.

Operations in Sacroiliac Disease.—Howard Marsh³ has lately operated upon 4 cases presenting this condition. One case is of particular interest, as it is probably an example of senile tuberculosis, occurring in a patient 61 years old. He removed a piece of bone $\frac{3}{4}$ in. long by $\frac{1}{2}$ in. broad. The result was excellent, as the patient entirely recovered. He concludes that there is ample evidence to show that when operative treatment is adopted early and conducted on aseptic lines, recovery will take place in a large proportion of cases, even though the disease has advanced to the stage of suppuration and sinuses have formed.

Congenital Absence of the Radius.—Henry Ling Taylor,⁴ at a meeting of the Orthopedic Section of the New York Academy of Medicine,

¹ Brit. Med. Jour., Oct. 16, 1897.

² Arch. f. klin. Chir., Band lv., S. 435.

³ Brit. Med. Jour., Mar. 5, 1898.

⁴ N. Y. Polyclinic, Nov. 15, 1897.

reported 4 cases, 2 in which the radii were absent, 1 with the radius abnormally small, and 1 in which the radius was thickened and bent toward the ulnar side. In the case in which both radii were absent, the hand on one side was at right angles with the forearm. In calling attention to the treatment of the deformity which results from this condition, he suggests that mechanical treatment should precede operation. Contracted structures may be divided. Osteotomy may be followed by overcorrection, and the ulna may in various ways be attached to the carpus in an improved condition. The report of 1 or 2 good results of a permanent nature would enhance the value of the contribution. [Our own results have not been brilliant.]

Multiple Rachitic Deformities in One Family.—Frisbie,¹ of San Francisco, reported the case of a family illustrating this condition. The father and eldest son give a distinct history of rachitis in their younger days. One son, now 13 years of age, shows marked enlargement of the epiphyses, rachitic rosary of the ribs, and a pronounced genu valgum. Another son, a few years younger, had a genu valgum of one leg and genu varum of the other. The epiphyseal hypertrophies are also well marked, and the rachitic rosary is noted. [The illustrations unfortunately are too poor for reproduction—and one must rely on the description. The surgical treatment is not new and adds nothing to the value of the report.]

Congenital Malformation of the Lower Extremity.—V. P. Gibney² exhibited photographs of a very interesting case at a meeting of the Orthopedic Section of the New York Academy of Medicine: A boy, 12 years of age, whose limbs were normal above the knee, but were remarkably deformed below. The right leg had no fibula, while the tibia was greatly curved. The foot had only 3 metatarsal bones, and 2 of the toes were webbed. The left leg was longer than the right and the bones very much atrophied. The right foot was held in the position of talipes equinovagum and the left in talipes equinovarus. A double amputation of the distal ends of the feet was performed, a pair of artificial limbs fitted, and the lad walks easily. His general improvement has been marked.

Disease and Deformity of the Tibia.—S. Ketch,³ of New York, reports a case of unusual deformity of 5 years' duration. The patient, a girl, 12 years old, presented an anterior curve of the right tibia and some eversion of the foot. The bone was 3 in. longer than that of the well leg and greatly thickened. The circumference of the leg was $1\frac{1}{2}$ in. larger than on the well side. There was no evidence of syphilis or history of transmission. The general opinion was that the case was one of abscess of the tibia. [This view was maintained by one of the collaborators of this article, because of one or more similar cases verified by operation. Multiple abscesses along the shaft of the bone were found in one instance. The relief was prompt and permanent. We have since been informed by the writer that the case proved, however, to be syphilitic disease of the tibia, and has yielded to the usual treatment for this disease.]

The Direct Transplantation of Muscles in the Treatment of Paralytic Deformities.—J. Goldthwait⁴ has made a very careful study of this subject. Of the 30 cases which have come under his care, the improvement, with one or two exceptions, has been very decided. He states that it has been definitely proved that the tendons of nonparalyzed muscles can be attached to the tendons of those which are paralyzed, with a marked improvement in the usefulness of the part, as well as correcting or diminish-

¹ Pacific Med. Jour., Jan., 1898.

² Ibid., Nov. 19, 1897.

³ Tr. N. Y. Acad. of Med., 1898.

⁴ Boston M. and S. Jour., Nov. 11, 1897.

ing existing deformities. He reports 5 cases in which the sartorius muscle was transplanted and attached to the quadriceps extensor just above the patella. In 3 the result has been a marked improvement; in 2 the result was a disappointment, the failure probably being due to imperfect methods of attaching the muscle. [The operation is to be heartily commended, and should be taken up by orthopedic surgeons.]

Functional Pathogenesis of Deformities.—Julius Wolff,¹ in his able paper on this subject, adds to the "pressure-theory" of Volkmann Heuter, which has hitherto been the basis for all explanations of the origin of the various deformities of bone. He seeks further to bring forth new proofs to strengthen his doctrine of the functional pathogenesis of these deformities, founded as it is on the general theory of the "functional conformation" of the bones. He has also discussed the objections and confirmations of the theories which have appeared since their publication.

Elongation of the Femur following Necrosis.—W. R. Townsend,² at a meeting of the Orthopedic Section of the New York Academy of Medicine, presented a man, 55 years of age, whose right femur was $2\frac{1}{8}$ in. longer than his left. He walked with scarcely any limp and wore a shoe raised $1\frac{1}{2}$ in. The history he gave was that he was perfectly well until the age of 12 years, when from some unknown cause a swelling occurred on the lower and inner side of the thigh, and when it broke some pieces of dead bone came away; this continued for a year. His limbs had always been of equal length. The lengthening was first noticed at the age of 13, and reached its maximum when he became of age. Evidently the necrosis affecting the lower end of the femur had produced an irritation and increased growth of the cartilage and bone at the junction of the lower epiphysis with the shaft. The circumference of the patient's thighs and legs was about the same.

An Operation for Ununited Fracture in the Neck of the Femur.—A. J. Gillette³ describes an operation which he performed on a case of intra-capsular fracture of the hip. "A horseshoe-shaped incision, beginning 1 in. below and 1 in. posterior to the anterior superior spine of the ilium, carrying it down 2 in. below the trochanter major, and bringing it up to the buttocks to about the center of the gluteus maximus muscle; the skin, superficial and deep fascia were dissected *en masse*. A chain-saw was then passed between the posterior border of the tensor vaginæ femoris and the gluteus medius, hugging the neck of the femur and the base of the trochanter major; it was brought out between the posterior surface of the gluteus medius and the anterior surface of the gluteus maximus, thus sawing off the trochanter major and its muscular attachments, which were then turned back, making an *exposé* of the capsule of the joint. The line of fracture through the neck of the femur could be easily seen. The surfaces of the fractured ends were denuded and a bone-peg was driven through the neck of the femur, thus holding the fractured ends together. The capsule was then stitched with catgut, the trochanter major nailed with a small bone-peg back to its original position, the skin and fascia-flap sutured, and a silicate spica applied. An excellent result followed. There was no pain on motion, and sufficient flexion and extension remained to enable the patient to walk.

¹ Ann. of Surg., July, 1897.

² Med. Rev., Dec. 10, 1898.

³ Tr. Am. Orthoped. Assoc., 1898.

OPHTHALMOLOGY.

By HOWARD FORDE HANSELL, M. D., AND WENDELL REBER, M. D.,

OF PHILADELPHIA.

Epitome.—The past year in ophthalmology has been one of broadening rather than advance. It has been a year rich in clinical, pathologic, physiologic, and bacteriologic proving of many moot points in ophthalmology. For instance, the most recent ideas as to the histology of the retina furnish more or less of an accurate physical basis for our theories concerning the intimate nature of vision of form and color. The absolute necessity of good sight in all who participate in the public transportation-service of all countries was emphasized at this year's International Hygienic Congress; and in this connection is to be mentioned the prominence now given to refraction as one of the most fruitful branches of preventive medicine. The added evidence which each year brings forth shows all too plainly that neglect of refractive errors means not only chronic ocular affections, but also chronic neuralgia, migraine, and often nervous breakdown. If such are the consequences, the doctrine of prevention by refraction deserves the widest acceptance. Every case of headache, the etiology of which is at all obscure, should receive a careful examination of the eyes as to refraction and the muscular status. Nothing short of an examination under a mydriatic that completely paralyzes the accommodation is sufficient. While there may be a number of underlying conditions at work to cause a headache, eye-strain of any kind, if present, may be a dominant factor in the attack; and the relief of this strain will often exert a most favorable influence. Just at present the ophthalmic world seems to be unable to decide what is the best every-day mydriatic; but this is a question that turns so much on the method of use that entire agreement on any one drug is hardly likely to occur. High myopia continues to be a bone of contention. It has been well said that high myopes and cataractous patients cannot by any means be placed in the same category; that if the risks of operation are proved to be from 5% to 10% within 4 years of operation, they will undoubtedly prove much higher later on, after time and work have contributed their share to the ultimate conditions of the eye. The eye-muscles also offer much room for speculation. The pendulum that began to swing away from the operative treatment of muscular anomalies in 1897 has gone so far that operative interference is now restricted to those anomalies not amenable to innervational treatment, or prisms in the position of rest. Convergence-training is now a thoroughly established method, thanks to the persistent advocacy and courage of its promoters. There has been one splendid addition to our knowledge of the dynamics of the ocular muscles during the year, and one of less worth. As to the participation of the eye in general diseases, the main fact of the year is the demonstration that in all syphilitic affections of the eye the cardinal change consists in an inflammation of the intima of the blood-vessels, a fact which has long been held by

analogy, but has never before had such a striking anatomic demonstration. Autointoxication is being credited with responsibility for many of the ocular complications of general processes, such as influenza, lithemia, uricacidemia, tuberculosis, gout, etc. Of importance, in the latter connection, is the prognostic value of the appearance in the retina of albuminuric lesions. It has been pretty conclusively shown that fully 80 % of such patients die within 1 year after the appearance of the eye-lesions. The urgency of the detection of ocular signs in tabes, multiple sclerosis, and general paralysis is now an accepted fact, and no careful worker in this field thinks of forming a positive diagnosis without thorough exploration of the visual sphere for such signs. Lacrimal affections have come in for an unusual amount of discussion, and there seems to be a pretty even division as to whether treatment shall be medicinal or mechanical. There is no longer any doubt, however, that the majority of such affections are of nasal origin; in fact, there has been an unusual amount of literature this year on the diseases common to the eye and nose. The question of simple or combined extraction of cataract is still *sub judice*. We can only repeat our suggestion of a year ago, that "surgeons whose cataract-extractions number perhaps 25 in a year, should continue to practise the method they have used from the beginning," and thus subject their patients to no added risk. Our knowledge of secondary cataract has received a magnificent contribution this year; while sympathetic ophthalmia remains in its old-time pathologic obscurity. Glaucoma has claimed a good deal of attention, and now boasts a new operation—namely, bilateral exsection of the superior cervical ganglion. Rachitis is being made to bear the responsibility of retinitis pigmentosa; and certain forms of retrobulbar neuritis have at last been shown to be ascending degenerations secondary to degeneration in the ganglionic elements of the macula. This has long been suspected, but never before proved. Perhaps no other department of ophthalmology has received such a pronounced impetus as the bacteriology of the conjunctiva. The sac has, according to our present knowledge, 2 almost constant residents, the *Bacillus xerosis* (Eyre) and the *Staphylococcus epidermus albus* of Welch (Randolph). The impossibility of sterilizing the conjunctival sac is pointed out, and the greater approach to sterility of the upper, as contrasted with the lower, half of the sac, shown. The almost unanimous opinion at the late meeting of the British Medical Association was that the main things in preoperative cautions were the necessity of cleansing the eye and its adnexæ thoroughly, and of scrupulous cleanliness of the instruments. The treatment of diseases of the anterior ocular segment has undergone some changes, less marked in method than in remedy. The organic silver salts are commanding much attention, with protargol quite the most popular among them, even though it is one of this year's newest remedies. It is a loose combination of protein and silver. Among the other new remedies are to be mentioned ichthalbin, nosophen, cassareep, sanoforn, extract of suprarrenal capsules, xeroform, iotril, airol, arecolin hydrobromate (which gives promise of being a myotic of no little potency), and euphthalmin, a new mydriatic candidate. Formalin has become firmly established in our armamentarium therapeuticum, and holocain, too, has proved its eligibility and has come to stay. Electrotherapy has been more talked about lately than for many years past. The new instruments of the year include an ingenious ophthalmoscope, offering more lenses than any heretofore shown, a rational modification of Javal's ophthalmometer, and a most unique perimeter that weighs entire only 1 pound. As foreshadowed in the YEAR-BOOKS for 1897 and 1898, the X-rays have become indispensable in the localization of suspected foreign bodies in the eye, and are now employed in most cases in which the

intruder has passed beyond the anterior ocular segment and cannot be located with the ophthalmoscope.

CONGENITAL ANOMALIES, ANATOMY, AND PHYSIOLOGY.

Congenital Anomalies.—J. R. Rolston¹ reports 2 instances of congenital one-sided anophthalmos, in neither of which could any trace of the eyeball be detected. Laquer's² analysis of a great number of cases shows that among hereditary eye-diseases retinitis pigmentosa stands first, with congenital cataract a good second; then come, in the order mentioned, albinism, total and partial absence of the iris, microphthalmos, juvenile cataract, coloboma of the macula, dislocation of the lens, high myopia, and buphthalmos, or infantile glaucoma. Consanguinity was operative in about 35% of all cases of retinitis pigmentosa investigated.

Anatomy.—Fautier³ says that the macula is fully $\frac{1}{2}$ to $1\frac{1}{2}$ mm. below the level of a horizontal plane passing through the center of the papilla. It is visible in the cadaver as a brown point with yellow borders. The distance of the center of the macula from the center of the disk is 4 mm. larger in myopes than in emmetropes. It is 2 mm. in length and 3 mm. in height.

W. Harris⁴ holds to Förster's theory, that the nerve-supply to the macula is invariably arranged on the same plan as that of the rest of the retina, and that each half is innervated from the corresponding half-vision center in the cuneus. Further, that in each half-vision center the corresponding halves of each macula are represented in a special area which is more richly supplied with vessels or more resistant to disease than the rest of the visual center. Hence, study of cases of transient hemianopsia affords "complete proof that the macula is innervated on the same plan as the rest of the retina," and that no special decussation of the macular fibers occurs. In persistent hemianopsia the dividing-line never passes exactly through the macula. The cortical center for the macula may either have escaped destruction or regained some of its functions, or a new fixation-point close to the fovea may have been developed by education.

Physiology.—Breuer⁵ attributes to the cones of the retina the function of distinguishing colors, and to the rods the differentiation of light and darkness. The rôle of the latter is characterized by their inaptitude for distinguishing colors, their exquisite sensibility in detecting objects in feeble illumination, their marked affinity for rays of feeble intensity, and their complete absence at the fovea. A case of absolute color-blindness is recorded by V. Fukala⁶ as seen in a young healthy subject who had had some central nervous disorder in infancy.

Bernheimer,⁷ tracing the paths of the pupillary reflex in human embryos, found that the pupillary fibers cross along with the visual ones; that, in addition to the peripheral connection of each eye with both sphincter nuclei, there is a central connection between the sphincter nuclei, effected perhaps by contact of the ends of the axis-cylinder processes branching out toward each other from the closely situated nuclei. L. Heine's⁸ investigations confirm Beer in his statement that the mechanism of accommodation in birds' eyes is essentially the same as in the human eye; and C. Hess and Heine⁹ show that the range of

¹ Lancet, June 25, 1898.

² Ann. d'Oculist., June, 1898.

³ Rec. d'Ophthal., Mar., 1892.

⁴ Ibid., Sept., 1898.

⁵ Centralbl. f. prakt. Augenh., Feb., 1898.

⁶ Brain, vol. xx., No. 79, 1897; Ophth. Rev., Mar., 1898.

⁷ Klin. Monats. f. Augenh., May, 1898.

⁸ Graefe's Archives, June 17, 1898.

⁹ Ibid., Sept. 13, 1898.

accommodation in dogs, cats, and rabbits is rudimentary, averaging from 1 to 3 D.; while that of apes, doves, and buzzards averages from 10 to 12 D. C. Hamburger¹ has found with the manometer that the pressure in the anterior chamber and the vitreous chamber is practically the same. Silex² announces 3 centers for eye-movements in the brain-cortex: one in the occipital region, one well forward toward the forebrain, and the third within a portion of the facial area. The first 2 are centers for associated movements; while the last one is viewed by Silex as the center for voluntary movements.

REFRACTION.

Public Hygiene.—In the matter of public hygiene, the following interesting facts were submitted at the second international conference on the railway and steamship aspects of this question: In Brussels (and Belgium) all subjects are disqualified for the public service who present hypermetropia of more than 4 D., myopia of more than 5 D., and astigmatism of more than 2 D. In France, hypermetropia of more than 2 D., myopia of more than 6 D., or astigmatism of more than 1 D. is sufficient to disqualify; while in Italy normal visual acuity, form-field, and color-perception are requisite.

Kindergartens.—C. A. Wood³ claims that kindergarten-teachers should have sufficient knowledge of the eyes to detect any ordinary visual defects in their pupils, and suggests that all fine work (matwork and the like) should be withheld from beginners in this work.

H. Cohn⁴ asserts that examinations of the eyes in-doors is no test of their actual capacity, and that all examinations of the eyes of school-children, etc., should be made out-doors, as otherwise there can be no true standards. He states that the superior visual acuity of Indians and other savages is due to the necessity of concentrating their attention on objects on which their food and safety depend, and proves his assertions by statistics—many new and personal—which demonstrate that the out-door eyesight of civilized peoples averages as high as that of the uncivilized. He concludes that any one can make his eyesight equal to that of a savage by concentrating his attention sufficiently. He adds a plea for more out-door life for children, even at the expense of their studies, and training in closer observation.

Eye-strain and General Disease.—C. Prentice⁵ offers an explanation of the decrease of refraction in patients with glycosuria, which differs essentially from the theory proposed by S. D. Risley, who described the condition (see the YEAR-BOOK for 1898) and attributed it to an increase in the index of refraction of the lens. Prentice explains the decrease in refraction when sugar was absent from the urine by assuming a coincident change or depression of nerve-action in those centers which preside over the functions of the ciliary muscle and the kidneys, and believes that if the refractive condition could have been held at its lowest point glycosuria would not have returned. G. M. Gould,⁶ under the heading of "A Pair of Mathematically Perfect Eyes," records the case of a 50-year old man who came to him with a history of repeated subconjunctival hemorrhages, without any discoverable cause therefor. Under a mydriatic it was found that he accepted a weak minus cylinder at 90° in the R. E. and at 180° in the L. E., which was worn for 6 months, and during this time there had been no recurrence of the hemorrhages, and the patient wore

¹ Centrbl. f. prakt. Augenh., Sept., 1898.

² N. Y. Med. Jour., July 17, 1898.

³ N. Y. Med. Jour., Nov. 2, 1897.

⁴ Klin. Monats. f. Augenh., Sept., 1898.

⁵ Rev. gén. d'Ophtal., Aug. 31, 1898.

⁶ Jour. Am. Med. Assoc., Aug. 24, 1898.

his distant correction all the time simply for comfort. Cheney¹ calls special attention to eye-strain as the underlying cause in many instances of unexplainable drowsiness and vertigo; and A. Greenwood² shows by a tabulation of several hundred cases that eye-strain produces most frequently frontal, then temporal, and then occipital, headaches. He feels that it cannot be brought too forcibly to the attention of the general practitioner that the cases presenting the most violent headaches are those that apparently have perfect sight and no distinct ocular symptoms. A remarkable change in refraction in a patient whose interni had been tenotomized is reported by J. E. Jennings.³ Prior to operation the refractive status was: R. E., + 1 D. S. \ominus + 1 D. cyl. axis 120. L. E., + 1 D. S. \ominus + 1 D. cyl. axis 60. After the tenotomies the condition was R. E., + 1.5 D. S. \ominus + 2.5 cyl. axis 105. L. E., + 0.5 D. S. \ominus + 1.25 D. cyl. axis 75. A. Peters⁴ insists that many forms of asthenopia and mild conjunctivitis are due to latent refraction-errors, which set up eye-strain.

Methods.—C. G. Fellows⁵ is well satisfied with estimating refraction by means of de Zeng's refractometer, claiming that it gives the astigmatic meridian or meridians and the total error of refraction as correctly as though the patient were under the influence of a mydriatic. [Our experience with this instrument has not been favorable. It demands too much intellect and co-operation on the part of the patient, and in our hands has been neither a time-saver nor an accurate measurer.] F. Van Fleet⁶ feels that those oculists who determine refraction by the use of atropin or other mydriatics ought to go to New York to study ophthalmology! [Doubtless it will be a matter for chagrin and keen regret to most of the thinking oculists of this country to learn that they have gone far astray; but there is yet a little balm in Gilead. For those of us who practise in the backwoods Van Fleet has unlocked his wisdom, and out of the fulness of his heart and the heaps of his knowledge he has written on "How to do it right!"]

Retinoscopy.—Convinced that the greatest annoyance and trouble in acquiring skill in the shadow-test proceeds from the occurrence of the scissors-movement and from spheric aberration, J. Thorington⁷ suggests lenses illustrating the above phenomena. They are of such size that they may be placed before the schematic eye, and the difficulties surrounding every-day work with the retinoscope can thus be reproduced for purposes of clinical and private study.

Mydriatics.—At the meeting of the Western Ophthalmologic and Otolaryngologic Association⁸ it was evident that the majority of the speakers did not look upon homatropin as a reliable cycloplegic. [If this opinion were to gain much ground, it would be rather unfortunate; the more so as homatropin is a boon to the oculist who must compromise with many of his patients on the matter of time, a class that is in abundant proportion in the practice of nearly every oculist. If this is the opinion of these speakers, what have they to offer in its stead that will come up to our conceptions of an ideal mydriatic? Scopolamin? Not exactly, for it will incapacitate the patient for 3 or 4 days at least, if it has been pushed to thorough paralysis of the accommodation, as any cycloplegic should be, before withdrawing it. Hyoscin or duboisin? Most assuredly not; unless they are taken simply in preference to atropin, which is being used less and less every day. This is a busy world, and most patients

¹ Boston M. and S. Jour., Feb. 17, 1898.

² Ibid., Dec. 23, 1897.

³ Am. Jour. Ophth., Aug., 1898.

⁵ Clinique, Chicago, Mar. 15, 1898.

⁷ Jour. Am. Med. Assoc., Dec. 18, 1898.

⁴ Sammlung z. Abh. a. d. Geb. d. Augenh., No. 7, 1898.

⁶ Post-Graduate, Dec., 1897.

⁸ Am. Jour. Ophth., July, 1898.

either are busy people or imagine they are, which is the same thing; and they protest to the point of outright rebellion against any and all mydriatics. It has often seemed to us that homatropin failed of its purpose because of faulty use of it. There is no question about its greater efficiency when used with a 2-4% solution of cocain; but to this some object that cocain alters the intra-ocular tension and oftentimes the true character of astigmatism, a contention as yet unproved. On the other hand, it can be said that cocain, by its action on the corneal epithelium, favors the absorption of homatropin, and by setting aside all reflex spasm of the lids permits the mydriatic to remain much longer in contact with the cornea, a point of no little import, seeing that the major portion of any mydriatic must make its way through that membrane to work out its purpose. Moreover, all solutions entering the eye should be of body-temperature. If with these precautions homatropin, or especially homatropin and cocain in combination, are instilled in 1-2% solution every 5 minutes for an hour, it will be only the most exceptional cases that will not present almost complete paralysis of the accommodation (as determined with the 0.5 D. type and a +4 D. S. over the distance-correction) half an hour after the last drop; if any spasm remains, it is pretty sure to affect only the spherical aspect of the refraction, and this small amount will be cared for by almost any ciliary muscle. We have spoken at some length in criticism of the foregoing opinion because it bears directly on a practice that is now in vogue in the offices of perhaps nine-tenths of the oculists of this country.] Treutler¹ speaks of the advantages of euphthalmin as a mydriatic pure and simple. Its influence on the accommodation is too feeble to consider its use in refraction. [However, this will render it an almost ideal agent for retinoscopy, which calls for quick action on the pupil and absence of effect on the corneal epithelium and on the accommodation. These conditions, it is claimed, are met in euphthalmin. If so, it deserves a trial in retinoscopy.]

J. L. Moffat² approves of C. Marten's suggestion that "astigmia" and "astigmatic" are more desirable than the terms "astigmatism" and "astigmatic," on the ground that the derivation and meaning of the Greek words "stigma" and "atos" signify a puncture or point. [We leave this to the etymologists to settle.] In 25 cases examined from 4 months to 4 years after the first measurement, F. Valk,³ found that the radius of curvature of the cornea had decreased in but 4, and increased in 21 cases; also that the average corneal radius in 80 children under 10 years of age was 7.37 mm., and in 25 people over 40 years was 7.63 mm., an increase in corneal radius in old people which confirms the supposition that the cornea becomes slowly flattened with age. Despagne⁴ places on record an instance of extreme astigmatism of one eye. The refraction was as follows: R. E., -6 D. S. L. E., +4 D. S., -14 D. cyl. With these lenses the patient enjoyed binocular vision. C. W. Hawley⁵ directs attention to the necessity for care in the selection of frames that are to carry the lenses (whether spectacles or eye-glasses), the nicety of their adjustment to the nose, their cleanliness, and such small details as are sometimes overlooked by the busy oculist.

Myopia.—Wolffberg⁶ uses statistics to show that prolonged reading or writing in a poor light or at too close a range is responsible for most acquired myopia; also that congenital or hereditary myopia is the variety that generally leads to progressive high myopia and all its evil results. Measures taken against acquired myopia are therefore means preventive of congenital myopia

¹ Klin. Monats. f. Augenh., Sept., 1897.

² Jour. Ophth., Otol. and Laryn., Oct., 1898.

³ Post-Graduate, Dec., 1897.

⁴ Rec. d'Ophthal., Nov., 1897.

⁵ Refractionist, Dec., 1897.

⁶ Woch. f. Therap. u. Hyg. d. Auges, Jan. 8, 1898.

in the next generation. J. Widmark's studies¹ of myopia among the young men and women in some of the high schools of Denmark and Sweden rather indicate a greater vulnerability in the female ocular tissues, as is shown by the greater frequency of high myopia among the females.

Operative High Myopia.—K. Scott² well says that high myopes and cataractous patients cannot by any means be placed in the same category. In view of the inflammatory results, with their far-reaching consequences, the surgeon, in the present state of our knowledge, should wholly abstain from recommending removal of the clear lens in high myopia until the method has been resolved into one which is entirely free from all risks of the onset of any after-inflammation. To C. Wray's mind,³ published cases appear to prove that as far as the immediate results and risks are concerned, we are not yet justified in renouncing extraction of the lens in high myopia. He puts his finger on the weak spot in the statistics—namely, that they bear on *immediate* consequences only. Up to August, 1897, over 2000 patients with myopia of more than 10 D. had submitted to operation; but up to the present time no one has attempted to show the probable *ultimate* consequences. Postoperative losses are principally from detached retina and inflammatory affections in which the ciliary region participates. His own notes of 123 *nonoperated* myopes over 10 D. have not shown 1 case of detachment under 45 years of age, while it occurred 3 times in patients over that age. After operation it occurred in from 5% to 10% of the cases. He remarks that detachment and iridocyclitis have been seen as long as 4 years after the extraction, and he is impelled to the conclusion that if the risks of operation are proved to be 5% to 10% within 4 years of operation, they will undoubtedly prove much higher later on, after time and work have contributed their share to the ultimate conditions of the eye. In a case of removal of the clear lens for progressive high myopia, H. D. Noyes⁴ reduced the error of refraction by 16 D.; and W. H. Wilmer⁵ observed a reduction of 22 D. after a similar operation. He makes a slight discission with a very small opening in the anterior capsule, following with the extraction in 6 days. Noyes considers the operation justifiable in young subjects with 13 or more diopters of myopia if the fundus-conditions are good; while Schnabel,⁶ in addition to Noyes's specifications, lays much stress on the occupation of the patient and whether the far-point lies within 60 mm. V. Fukala⁷ contributes a few more instances of extreme myopia that show striking results after extraction of the lens.

DISEASES AND ABNORMALITIES OF THE MUSCLES.

Physiology.—Using rabbits as his subjects, A. Toplanski⁸ has been studying the action of the ocular muscles under stimulation of certain areas in the cerebral cortex, and has arrived at practically the same results as Sherrington 2 years ago (see YEAR-BOOK for 1898). [Sherrington's work is of much more scientific value, as it was done on the anthropoid apes, whose brains conform much more closely in their physical characteristics to the human brain.] Working at this question from an entirely different standpoint (the speculative side), Antonelli⁹ has come to view many of the visual anomalies peculiar to hysteria as dissociation-acts; he looks also upon the amblyopia of squint as a

¹ Mittheil. a. d. Augen. d. Carolin. med.-chir. Inst., Stockholm, 1898.

² Lancet, Sept. 24, 1898.

³ Tr. Am. Ophth. Soc., 1898.

⁴ Wien. med. Woch., June 4, 1898.

⁵ Graefe's Archives, vol. xlvii, Sept. 13, 1898.

⁶ Brit. Med. Jour., Aug. 20, 1898.

⁷ Ibid.

⁸ Ibid., Apr. 9, 1898.

⁹ Centralbl. f. prakt. Augenh., Feb., 1898.

dissociation of the complex coördinations which together constitute the act of binocular vision. In his opinion, reading is no mere act of a correlated mechanism, as held by Donders; but is rightly considered a function of the very highest order. He thinks it probable that somewhere in the cerebral cortex there exists a special apparatus (center?) for binocular vision. Weiland,¹ proceeding from still another direction, argues against the assumption that any one ocular muscle completely antagonizes any other in its action. While each muscle acts independently about its own axis, tending to rotate the ball in its own particular direction, nevertheless all the muscles participate in all excursions of the globe. He endeavors to show that the accepted idea that the inferior oblique rotates the cornea up and out is incorrect, and that its true action is to roll the cornea up and in. [All of which may be so, and yet this much must be said, that our present views of the ocular movements are that no movement of the eyes in any direction is performed by any one muscle; that every possible movement of the eyes under normal conditions is known as an associated movement, seeing which, the number of combinations that may be effected by the 6 pairs of muscles is simply bewildering. There is much need of physiologic experiment along these lines.]

Diagnosis.—For determining the declination of the vertical and horizontal meridians of the eye, G. T. Stevens² suggests, as a substitute for his expensive clinoscope, the lens-clinoscope, or torsionmeter, an inexpensive device consisting of two oculars, made each in the form of the ocular of the tropometer. Each consists of a magnifying system, with a concave and a convex lens, and of a glass screen, on which is drawn one part of a haploscopic diagram. When seen with the 2 eyes these parts of the diagram unite as in the stereoscope. The lens-system can be focussed on the diagram, so that the latter may be clearly seen by persons with different refractions. According as there is declination of the vertical meridians to the right or left, he tenotomizes the

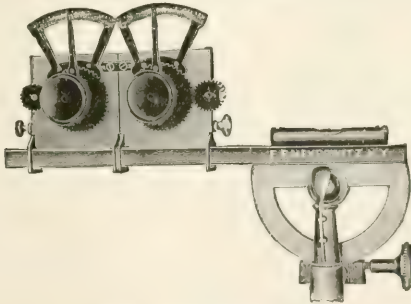


FIG. 77.—Stevens's lens-clinoscope.

overacting upper or lower half [!] of the offending internal or external rectus at its tendinous insertion, which he claims will have the effect of establishing parallelism of the 2 meridians. [This amounts to a refinement of his previous partial tenotomies, and though we are without knowledge of such conditions or procedures, we must say that they would seem to be devoid of practical value. Bannister's³ splendid contribution to our knowledge of the dynamics of the

¹ Knapp's Archives, Jan., 1898.

² Ophth. Rec., May, 1898.

³ Ann. of Ophth., Jan., 1898.

ocular muscles is based on examinations of the eyes of 100 United States Army recruits, who certainly stand for as close approach to physical perfection as is obtainable. It is therefore not surprising that his figures do not support the findings of Risley and others, who conducted their observations on healthy eyes engaged more or less in *near-work*; but Bannister does establish a good health-standard for us in this direction, and that is no little matter.] The statistics which F. B. Tiffany¹ offers as bearing on this same question are unfortunately robbed of a good deal of their scientific interest by reason of the fact that refractive errors play no little part in many of the cases tabulated. [Moreover, the number of cases of emmetropia cited in Tiffany's tables cannot but raise some doubt in the mind of the judicial worker.]

Asthenopia.—Asthenopia in its various phases is discussed by Reddingius,² who is convinced that many instances of so-called muscular asthenopia (latent divergent squint, or exophoria) are simply cases in which accommodation precedes convergence, and that asthenopia is due to the fact that these 2 acts, in themselves normal, are abnormal in their relations. [Just so. And when the normal relations between accommodation and convergence are in any way disturbed, we are not infrequently confronted with one of the most complex problems in all physiology. It will often require "infinite resource and sagacity" to cure such asthenopia.]

Heterotropia (Squint).—At this year's meeting of the British Medical Association Snellen³ indulged in a comprehensive review of all the aspects of the operative treatment of strabismus. Advancement of the tendon is particularly valuable when secondary operations are necessary and when there has been much cicatrization after previous operations. However, his preference for simple tenotomy is unmistakable. "By it satisfactory results are obtained in the majority of cases, certainly in all spasmodic squints as found in hypermetropia or with paresis of accommodation; but good results are secured often in parietic squints. Bad results after tenotomy are largely due to faulty technic. In order to secure binocular fixation it is often necessary to combine with operative treatment exercise and education of the weak muscles, which will overcome the want of fusion and restore the muscular tonus." The above views were echoed in the remarks by Williams (Liverpool), Little (Manchester), Berry, and Argyll-Robertson (Edinburgh). P. Smith⁴ lays great stress upon the educational treatment of strabismus. He claims that among a series of 200 cases of internal squint, a considerable proportion of the 200 were greatly benefited, both as to lessening the degree of squint and improving the acuity of vision, by the use of instruments of his own device for increasing the fusion-limit and single binocular vision. K. Hoor⁵ believes amblyopia ex anopsia is to be referred to a lack of physiologic development in the centers of vision, because the weakness of vision is in direct relation to the degree of turning. Schnabel,⁶ on the other hand, holds that hypermetropia does not cause strabismus in a normally placed pair of eyes; that strabismus is an anomaly of position and not of motion; and that it is independent of both hypermetropia and muscle-disturbances. [It would be interesting to know what Schnabel considers the normal position of the eyes.] In the operation of advancement, in which E. Praun⁷ firmly believes, he splits the muscle 4 to 8 mm. from its insertion and then carries the divided portions above and below the cornea, where they are anchored much the same as the

¹ Jour. Am. Med. Assoc., Oct., 1898.

² Brit. Med. Jour., Aug. 20, 1898.

³ Wien. klin. Woch., May 14, 28, 1898.

⁴ Centralbl. f. prakt. Augenh., Aug., 1898.

⁵ Ibid., July 2, 1898.

⁶ Ibid., No. 47, Nov., 1897.

⁷ Centralbl. f. prakt. Augenh., Sept., 1898.

divided portions of a split pterygium. C. H. Beard¹ is also an ardent advocate of advancement, and reposes little confidence in tenotomy. [This is extreme ground. Advancement certainly ought to be applied to an underacting muscle; while tenotomy seems the rational thing for an overacting one.]

Out of 67,622 patients applying for treatment, de Wecker² found 3002 cases of strabismus, of which number he states that 1330 (practically two-fifths) were incurable by operation. In commenting on these statistics, G. M. Gould³ insists that many more would have been cured had they been treated by glasses at an early period of life. In support of his contention, Gould cites several cases from his practice of children as young as 29 months who had worn glasses for hyperopia, with incalculable benefit to their eyes and to their general health. C. Prentice⁴ suggests a practical and logical way of curing internal squint without operation—namely, by “repression” of the ciliary impulse. His method is to prescribe a strong plus-spherical for reading, insisting that the patient shall hold his book as far away as is compatible with clear vision; he also reduces distant visual acuity to about $\frac{2}{3}$ by an overcorrection with a plus-glass; later, prisms, bases in, are added to the near-glass and the strength of the prism gradually increased as abduction and fusion-power develop. This method, it is claimed, will positively repress accommodation and thus favor abduction. In recording 3 very interesting histories treated by this method he tries to show an intimate relation in the central nervous system between the nuclei governing the organs of vision and those governing the thoracic and abdominal viscera, especially those of the latter relating to sex. In each case well-pronounced maladies of the sexual organs and other of the viscera are claimed to have been entirely dissipated by correction of states of abnormal tension in the eye-muscles. [Prentice's cases are not sufficiently numerous to demonstrate positively the soundness of his position; but they are exceedingly interesting as illustrating what may be accomplished without operation in these cases, and his method seems worthy of a trial.] In considering the causes which lead up to squint, Hansell and Reber⁵ lay great stress on the fact that the deviation in esotropia of the hyperopic variety (or internal squint) is not only *in*, but also *up*, due to the predominance of the third-nerve muscles, which, unduly stimulated (by association) through the excessive impulse to the ciliary muscle, act all together and roll the cornea up and in. Conversely, in exotropia of the myopic variety the deviation will be found to be not only *out*, but also *down*, because lack of stimulus to the third-nerve muscles (due to deficient impulse to the ciliary muscle) permits the fourth- and sixth-nerve muscles to prevail, and the eyes are turned down as well as out. Hence persistent use of a full correction, if possible, is advisable for 3 to 6 months in all squints, when all remaining deviation can be met by tenotomy or advancement, according to the nature of the case. In the treatment of all heterophorias they recommend, first, thorough trial of the effects of wearing the proper correcting-lenses; failing in this to establish proper relations between accommodation and convergence, they train abduction in esophoria, and adduction in exophoria, and, if necessary, order prisms in the position of rest. When all these means fail to afford relief tenotomy is indicated when the faulty muscles are overacting, and advancement when they are underacting. Permanent hyperphoria of more than 2° is to be met either by prisms in the position of rest or by operation. A. Duane,⁶

¹ Jour. Am. Med. Assoc., Oct. 8, 1898.

² Ann. d'Oculist., Jan., 1898.

³ Phila. Med. Jour., May 12, 1898.

⁴ N. Y. Med. Jour., July 24, 1897.

⁵ A Practical Handbook of Diseases of the Ocular Muscles.

⁶ N. Y. Med. Jour., June 4-18, 1898.

in a dispassionate and judicial article, gives the following indications for operations in muscular anomalies: Pronounced symptoms directly traceable to the eyes; constancy in the presence and amount of the anomaly; accuracy, and therefore certainty, of diagnosis. The conditions that operation may be expected to relieve are deformity and diplopia, asthenopia, inveterate headache, mental confusion, vertigo, impaired nutrition, and, in rare instances, chorea. In a case of essential epilepsy, the diagnosis of which disorder was confirmed by a number of neurologues, F. G. Murphy¹ ordered a total of 4° prism, base *in*, as a part correction of an exophoria of 6°. To his great surprise, the man appeared some weeks after, reporting much improvement, whereupon Murphy increased his prism-strength to 6°, his full prismatic correction. One year after, at the time the case was reported, there had been no recurrence whatever of the fits.

Spastic Conditions.—Among the conditions giving rise to nystagmus, or, as the author prefers to call it, "oscillation of the eyes," Galezowski² names certain occupations, congenital retinochoroiditis, buphthalmos, mixed astigmatism, capsular and lenticular cataract, and accidents involving both eyes. As a part of the symptoms of tetany, athetosis, and chorea, C. Kunu³ has observed spasms of the ocular muscles corresponding to the abnormal state of the general muscular system.

Muscles in Simulated Blindness.—E. Jackson⁴ recommends, as specially efficacious in detecting simulated blindness, the use of an 8° prism, base out, before the supposedly blind eye; the movement of either eye outward (when uncovered), to avoid diplopia, proves the visual acuity of the alleged blind eye. This is the method first advocated by de Welz, in 1867, and by G. C. Harlan, in 1873.

THE EYE IN GENERAL DISEASE.

[The eye, in its relation to the body, may be considered in a double aspect—namely, as a cause of disturbed function of other organs or as the site for the manifestations of disease in other parts of the body. From this section must be excluded the many organic effects of anomalies of the refractive and muscular apparatus, and there will be considered only the ocular phases of general diseases, either as the sole evidence or as part of the clinical history of those diseases.]

Syphilis.—[The involvement of the iris in the secondary and tertiary stages of syphilis is extremely common, and the clinical appearances of syphilitic iritis are well known. It is infrequent, however, that the opportunity for microscopic study of the inflamed membrane presents itself.] K. Baas⁵ found that the cardinal change in all syphilitic diseases of the eye is inflammation of the intima of the blood-vessels, resulting in obliterative endarteritis. His investigations proved that the iris shares in this process more frequently than any other structure of the eye. Involvement of the optic nerve is shown in a case of Juler's.⁶ He suspected intraocular growth on account of severe pain, inflammation, blindness, and high-grade optic neuritis, and after enucleation found gummatous deposits in the nerve-structure.

Lung.—The ocular complications of **pneumonia, influenza, and tuberculosis** may properly be ascribed to autointoxication. In a case of E.

¹ Ann. of Ophth., Jan., 1898.

² Beiträge z. Augenh., Jan. 15, 1898.

³ Graefe's Archives, vol. xlv., No. 3, June, 1898.

⁴ Rec. d'Ophthal., July, 1898.

⁵ Phila. Med. Jour., Apr. 16, 1898.

⁶ Rec. d'Ophthal., June, 1897.

Valude¹ infection of a previously diseased eyeball, following pneumonia and septic confinement, was preceded by a decided rise in temperature. E. Schwartz² furnishes further proof in a case of true primary purulent tenonitis occurring during the course of **influenza**. After the patient's death from the general disease the diagnosis was confirmed by microscopic examination. Tenonitis may, according to E. C. Ellett,³ be the local manifestation of the rheumatic diathesis. Although his case was a marked one (Fig. 78), attended with exophthalmos and immobility of the balls, the patient recovered. In a patient of Stoemer⁴ influenza was followed by iridocyclitis, atrophy of the left eye, and typical epileptic convulsions.

That autointoxication plays an important part in the creation of disease of the eye is confirmed by the researches of H. B. Young,⁵ who cites 6 cases of amblyopia that closely resemble the amblyopia of retrobulbar neuritis; also of C. A. Wood,⁶ who states as his belief that a certain class of cases of progressive optic atrophy is the result of the action of toxic products from the intestinal tract; and, finally, of C. Zimmerman,⁷ who mentions amaurosis, amblyopia, hemianopsia, and contraction of the visual fields, all of which are attributable to chemic alterations in the blood depending on autointoxication with globulins or products of regressive tissue-change in the maternal and fetal cells.

Many other ocular complications of influenza are difficult to classify as the results of autointoxication, such as "blue vision" (cyanopia), complained of in a patient of R. Hilbert,⁸ and monocular paralysis of accommodation, described by Williams⁹ and corroborated by Argyll-Robertson, Juler, Mackay, Brown, and Cargill.¹⁰

Tubercle.—The case of direct transmission of tuberculosis described by Coppez¹¹ is unusual. He claims that a dairymaid became tuberculous from the introduction of bacilli into the base of the distal phalanx of the ring-finger from the udders of a tuberculous cow. For the cure of ocular tuberculosis, Zimmerman¹² believes we have in tuberculin an important therapeutic agent for man and animals. Lagrange¹³ prefers [a more radical method, and one that seems more in conformity with the fatality of the disease—namely] enucleation, because, he says, the whole system is susceptible of contamination.

Diabetes.—Postmortem studies of the eyeballs and optic nerves of 2 diabetes by E. v. Grosz¹⁴ show that the nerve, as well as the lens and retina, is sometimes involved. The changes are those of the retrobulbar neuritis of alcohol and tobacco.

Typhoid Fever.—[In view of the great prevalence of typhoid fever in the military camps and hospitals of the United States during the fall of 1898, the remarks of Bull¹⁵ are interesting. Although collected from other sources, they



FIG. 78.—Tenonitis (E. C. Ellett, in Ophth. Rec.).

¹ Ann. d'Oculist., May, 1898.

² Ophth. Rec., May, 1898.

³ Jour. Am. Med. Assoc., Oct. 1, 1898.

⁴ Knapp's Archives, Sept., 1898.

⁵ Brit. Med. Jour., Aug. 20, 1898.

⁶ Boston M. and S. Jour., Jan. 6, 1898.

⁷ Ibid.

⁸ Beiträge z. Augenh., xxx., Jan., 1898.

⁹ Klin. Monats. f. Augenh., Aug., 1898.

¹⁰ Ibid.

¹¹ Klin. Monats. f. Augenh., May, 1898.

¹² Ibid.

¹³ Rec. d'Ophthal., May, 1898.

¹⁴ Centralbl. f. prakt. Augenh., May, 1898.

¹⁵ St. Louis M. and S. Jour., Oct., 1898.

are available and useful in the present epidemic.] He enumerates the ocular lesions in the order of their frequency: Catarrhal conjunctivitis, phlyctenular conjunctivitis and keratitis, paresis of iris and ciliary muscle, retinal hemorrhages, paralysis of external muscles, neuroretinitis and retrobulbar neuritis, uveitis, and perhaps cataract. [To this list might be added vitreous opacities and anemia of the retina and nerve.]

Nephritis.—The only indications of nephritis in T. Inouye's¹ case of a 21-year-old negro were retinitis and constant albuminuria of 1%. The retinitis was the first symptom noted. As to the mortality, in 98 cases of albuminuric retinitis E. Haeuble² found that 68% died within 1 year after the diagnosis of the retinal inflammation, and 82% within 2 years. He noted a pronounced difference in favor of females in the duration of life after the appearance of the ocular lesions. [His figures correspond with those of other recent investigators.] A. E. Adams³ believes that if abortion is ever justifiable, it is in cases of albuminuric retinitis in pregnant women, whose vision is reduced to a very low acuity, especially as the uremic condition is dangerous to both mother and child.

Epilepsy.—That the eye is subject to true epileptic attacks was first announced by Hughlings Jackson. Hutchinson⁴ describes Jackson's "epilepsy of the retina" as a sudden but transient blindness, due probably to alterations in the nervous and vascular supply of the deep centers of vision. The attacks are reflex in origin and are accompanied by signs of liver-derangement or other indications of disturbed health, and are prone to recur. Similar manifestations in the accommodation, the muscular sheaths of the arteries [temporary hemianopsia], and the extrinsic muscles are mentioned by Gouvea;⁵ while Ch. Féré and Ch. Landry⁶ say that cerebral anemia may explain some post-paroxysmal epileptic paralyses. Peripheral irritation as the origin of epileptic convulsions is well shown, by the effect of enucleation of an atrophied and painful eyeball, by Stoemer.⁷ From the time of the operation up to the date of the last observation the fits had ceased entirely.

Hysteria.—The most frequent disturbances in motility of the eyes of hysterics are said by C. Kunn⁸ to be: Disassociation of the ordinary associated movements, paresis, spasm, alternating esotropia, nystagmus, spasm or paralysis of the ciliary muscle and iris, blepharospasm, and ptosis. In addition, Wolffberg⁹ observed amblyopia of one eye and total color-blindness in both; and C. A. Wood¹⁰ adds visual field-defects, reversal of color-fields, monocular diplopia or polyopia, macropsia, and micropsia.

Tabes.—P. K. Pell¹¹ reports what he claims to be the first instance in which a tabetic crisis has been observed to involve a higher center, in his case the nucleus of the fifth nerve. The crisis consisted in recurring attacks of severe pain in both eyes, laceration, photophobia, and blepharospasm. Krepel¹² explains the frequency of atrophy of the optic nerve in tabetics and its infrequency or absence in general paralysis, by stating that "tabes strikes the most peripheral neurons and general paralysis the most central."

K. Baas¹³ insists on the diagnostic value of the early appearance of the following eye-symptoms in tabes and multiple sclerosis: Argyll-Robertson pupil,

¹ Klin. Monats. f. Augenh., Sept., 1898.

² Tr. Am. Ophth. Soc., 1898.

³ Rec. d'Ophthal., June, 1897.

⁴ Klin. Monats. f. Augenh., Aug., 1898.

⁵ Woch. f. Therap. u. Hyg. d. Auges, June 2, 1898.

⁶ Jour. Am. Med. Assoc., Nov. 12, 1898.

⁷ Jour. de Méd. de Paris, June 6, 1898.

⁸ Sammlung z. Abh. a. d. Geb. d. Augenh., No. 6, Oct., 1898.

² Centralbl. f. prakt. Augenh., Jan., 1898.

⁴ Charlotte Med. Jour., Apr., 1898.

⁵ Ibid., July, 1898.

⁸ Beiträge z. Augenh., Jan. 15, 1898.

¹¹ Berlin. klin. Woch., Jan. 10, 1898.

optic atrophy, ptosis, palsy of the external ocular muscles, nystagmus, anomalies in the visual fields. In tabes, palsies of the muscles within the eye and concentric contraction of the visual fields are to be expected. In multiple sclerosis, palsies of the external ocular muscles, nystagmus, and multiple small scotomata in the visual fields are in order.

General Paralysis.—Dawson and Rambaut¹ found, among 40 cases of general paralysis and in other forms of insanity, that syphilis was exceedingly common. There was paralysis of ocular muscles in 5 cases, and pupillary irregularity, consisting in mydriasis or myosis, in 95%, and in 67% impaired consensual light-reflex. Thomsen² points out that in general paresis, optic-nerve atrophy and Argyll-Robertson pupil often precede other symptoms by many years. [This is equally true of tabes, and this statement throws no light upon the differential diagnosis in the early and doubtful stage.] Antonelli³ believes that pupillary irregularity not only often forewarns of paresis, but is frequently more pronounced than the Argyll-Robertson pupil. Dawson and Rambaut⁴ found optic neuritis and optic atrophy in one-third of their cases.

Word-blindness.—J. Hinschelwood⁵ details a case of word-blindness without letter-blindness occurring in a 52-year-old man, who died from apoplexy soon after the observation was made.

Ophthalmic Zoster.—[The ocular complications of herpes enumerated by Sulzer⁶ are far more numerous and comprehensive than generally conceded.] He includes interstitial keratitis [an essentially different form from that resulting from inherited or acquired syphilis, but probably having the same signs], vesicular eruption on the limbus cornea, chronic ulceration of the cornea, general iritis, dilated pupil (from paralysis of the sphincter) or contracted pupil (from iritis), paralysis of the third pair, including ptosis and cycloplegia; and, exceptionally, paralysis of the fourth and seventh pairs, optic neuritis, and optic atrophy.

Injuries.—Following a traumatism to the left infraorbital margin and fracture of the cranial base, H. Hauptmann⁷ observed anesthesia in certain regions supplied by the fifth nerve, and later permanent paralysis of all the cranial nerves of the left side, from the third to the seventh inclusive. Following a somewhat similarly situated injury, A. Bourgeois⁸ saw paralysis of the left side of the face and of the right externus muscle. He thought the lesion was nuclear, and probably due to rupture of a blood-vessel. J. M. Mosher⁹ reports a case of cerebral blindness after injury to the head by a brick. One month later a series of attacks resembling petit mal commenced. Under hygienic treatment and the administration of strychnin vision rapidly improved. The patient was emmetropic, and the eyes were normal in every respect.

Reflexes.—Reflex causes of ocular pain, paralysis of accommodation, partial loss of vision, and hemianopsia may be traced to carious teeth (Wolffberg¹⁰), to the long-continued use of aconite (Wolffberg¹¹), and to uterine hemorrhages (A. R. Amos¹²).

Lead-poisoning.—Elschnig¹³ enumerates as ocular symptoms of lead-poisoning, in the order of their frequency: serous exudation into the papilla, followed by neuritic atrophy; retrobulbar neuritis, commencing with central scotoma and peripheral field-contraction; and spastic ischemia of the retinal

¹ Brit. Med. Jour., Sept. 10, 1898.

² Ibid.

³ Lancet, Feb. 12, 1898.

⁴ Beiträge z. Augenh., Jan., 1898.

⁵ Albany Med. Ann., Mar., 1898.

⁶ Ibid., Nov. 25, 1897.

⁷ Centralbl. f. prakt. Augenh., Feb., 1898.

⁸ Loc. cit.

⁹ Ann. d'Oculist., June, 1898.

¹⁰ Rec. d'Ophtal., Apr., 1898.

¹¹ Woch. f. Therap. u. Hyg. d. Auges, Feb. 3, 1898.

¹² Am. Jour. Ophth., June, 1898.

¹³ Ophth. Klinik, May 5, 1898.

vessels, announced by complete blindness. Only 16 cases of unilateral or bilateral ocular-muscle paralysis have been reported.

Exophthalmos.—Tellais¹ attributes the origin of many cases, particularly the intermittent and transient varieties in women of 60 years and older, to anomalous menopause and consequent uterine disturbances. In a young man the cause was found by H. Strachan² to be a tumor situated high up in the left naris and encroaching on the orbital wall; and in the case seen by A. Leeshafft,³ periodic exophthalmos was developed by the stooping position or by sleeping upon the right side. Terson's "alternating exophthalmos and enophthalmos," attended by diplopia, myosis, blindness, and pain while in the state of exophthalmos, was observed by Mogart and van Duyse;⁴ and as a complication of goiter in a young woman, J. Gifford⁵ reports exophthalmos of so high degree that the resultant corneal ulceration necessitated removal of both eyes.

In concluding this section it is interesting to note the result of the investigations of S. S. Golowin⁶ as to **the causes of blindness** among 552 persons, representing the populations of 18 institutions for the blind in Russia. 7% were born blind; 26% became so from essentially ocular diseases; 4% from injuries; 55% from general diseases; and 7½% from unknown causes. Of all the blind in these 18 institutions, purulent ophthalmia of infancy was responsible for 16½%, variola for 28%, and scrofula for 13½%.

AFFECTIONS OF THE LIDS.

The statement of Fleming,⁷ "that anatomists are agreed, on anatomic evidence, that **the orbicularis muscle** is supplied from the third-nerve nucleus" [cannot be accepted without qualifications. Too many instances of third-nerve nuclear paralysis (both singly and in combination with lesions of the other nuclei which are topographically closely related), without involvement of the orbicularis muscle, are recorded to permit Fleming's contention to go unquestioned. It must be admitted, however, that satisfactory explanations of both single and compound paralysis of the cranial nerves, when the lesion is presumably nuclear, are not always forthcoming]. For instance, it is difficult to attempt the solution of a case of congenital ptosis which came under the notice of v. Miller,⁸ in which movement of the affected lid was associated with contraction of the digastric and external pterygoid.

Syphilis.—Examples of the primary sore of syphilis appearing on the mucous membrane and margin of the lids are not infrequent. Seydel⁹ describes 3 cases, one occurring in a 27-year-old man, one in a 10-year-old boy, and the third in a 51-year-old widow. In a 2-year-old girl, who gave no other evidence of hereditary syphilis than notched teeth, R. Simon¹⁰ saw marked tarsitis of the right lower lid, which yielded in 3 weeks to vigorous inunction-treatment after other methods had been futile. This is the twentieth case of the kind in the literature.

Tumors.—Sarcoma of the right lower lid, with metastasis in the skin and mucous membrane, is reported by M. Ransohoff¹¹ in a girl of 12 years, who died of intercurrent diphtheria. To the 9 cases of cutaneous horn of the lid reported by Spietschka, T. Ballabon¹² adds another. [These tumors are not

¹ Ann. d'Oculist., June, 1898.

² Centralbl. f. prakt. Augenh., Sept., 1898.

³ Brit. Med. Jour., Aug. 20, 1898.

⁴ Am. Jour. Ophth., July, 1898.

⁵ Klin. Monats. f. Augenh., Apr., 1898.

⁶ Klin. Monats. f. Augenh., July, 1898.

⁷ Am. Jour. Med. Sci., Feb., 1898.

⁸ Rec. d'Ophtal., July, 1897.

⁹ Centralbl. f. prakt. Augenh., Feb., 1898.

¹⁰ Brit. Med. Jour., May 14, 1898.

¹¹ Centralbl. f. prakt. Augenh., May, 1898.

¹² Centralbl. f. prakt. Augenh., Apr., 1898.

uncommon. They are entirely innocuous, even when of many years' duration, and can be easily removed either by excision or by strangulation.]

Hordeolum is, as a rule, free from danger; yet the fatal ending of a case is recorded by H. Guth.¹ Infection, proceeding by way of the orbital cellular tissue to the cavernous sinus, finally set up fatal suppurative meningitis. For their local treatment Landolt and Gigar² employ: Tr. camphor., precip. sulphur, *ââ* gr. xv; lime-water, rose-water, *ââ* *z*üss; gum Arabic, gr. iij.

Blepharitis.—In the milder forms of blepharitis R. Hilbert³ employs yellow oxid of mercury ointment, and in the ulcerous form the red oxid, in the strength of 1:10. For the latter Pflüger⁴ prefers the mitigated stick after hot water has removed all the crusts and loose cilia. S. C. Ayres⁵ recommends that hydrogen dioxide be mixed with the hot water in dissolving the crusts, and when ulcers underlie the crusts they should be touched with a 2% silver-nitrate solution. For the silver nitrate Darier⁶ substitutes: Protargol, 24 gr.; zinc. ox., 15 gr.; powdered starch, 15 gr.; vaselin, 1½ oz.

Entropion.—In operating for entropion of the lower lid A. E. Prince⁷ excises the tarsus, except when the deformity is the result of cutaneous cicatrization. Theobald⁸ has revived the ancient measure of forming an eschar 3 or 4 mm. wide, 2 mm. from the ciliary border and the length of the lid, by means of caustic potash, in the treatment of the senile form. [It is almost painless, quite bloodless, and in the case of an old man, a patient in the Jefferson Medical College Hospital, was eminently successful.] F. Querenghi⁹ prefers the eschar made by the thermocautery, and feels certain a cure will result, provided the eschar includes not only the skin, but also the cartilage. The operation is adaptable to either lid.

DISEASES OF THE CONJUNCTIVA.

J. Eyre¹⁰ describes at great length the clinical and bacteriologic aspects of that form of subacute conjunctivitis termed by Morax and Axenfeld **diplobacillary conjunctivitis**. Clinically the appearances are those long since recorded as the signs of "angular conjunctivitis," according to Lawford.¹¹ Eyre finds that the disease commonly affects middle-aged females, and is quite amenable to zinc solutions. H. Cohn¹² calls attention to the frequency of follicular catarrh among school-children who do not complain of their eyes; and he points out the confusion that may arise from confounding this innocuous inflammation with the dangerous trachoma. B. K. Chance¹³ urges the general practitioner to watch for local conjunctival hemorrhages and phlyctenular conjunctivitis in children who are recovering from acute infectious diseases. Baas,¹⁴ assigns scrofula as the causative factor in 95% of all phlyctenular diseases of the conjunctiva; while H. Herbert¹⁵ finds that phlyctenules are frequently associated with chronic catarrhal and granular conjunctivitis, and that their site is not limited to the limbus cornea and ocular conjunctiva, but they may be also found on the conjunctiva of the lids.

Diphtheria.—H. Harlan¹⁶ found pure diphtheric bacilli in a membrane

¹ Prag. med. Woch., No. 3, 1898.

² Woch. f. Therap. u. Hyg. d. Auges, June 23, 1898.

³ Lancet-Clinic, Oct. 23, 1897.

⁴ Am. Jour. Ophth., May, 1898.

⁵ Ann. d'Oculist., Oct., 1898.

⁶ Ibid.

⁷ Ann. of Gyn. and Pediat., May 1, 1898.

⁸ Woch. f. Therap. u. Hyg. d. Auges, Sept. 29, 1898.

⁹ Jour. Eye, Ear, Nose, and Throat Dis., Oct., 1897.

¹⁰ Med. Bull., Oct., 1897.

¹¹ Ibid., July 14, 1898.

¹² Clin. Ophth., No. 1, 1898.

¹³ Tr. Am. Ophth. Soc., 1898.

¹⁴ Brit. Med. Jour., Aug. 20, 1898.

¹⁵ Berlin. klin. Woch., June 20, 1898.

¹⁶ Ophth. Rev., Mar., 1898.

removed from the conjunctival surface of the lower lid of a child who subsequently developed similar membranes in the throat. The membrane disappeared only after injections of antitoxin, although cauterants had been freely employed. While the clinical picture of diphtheric conjunctivitis furnishes valuable dependable data, the diagnosis in every case, says S. Stephenson,¹ must rest upon the presence of pure diphtheria-bacilli. The clinical features are given by him as whitish conjunctival patches containing dusky hemorrhages, enlargement of the preauricular glands, coincident diphtheria of the fauces, and subsequent loss of the knee-jerks or the occurrence of pareses or paralyses.

Purulent Conjunctivitis.—L. Howe² pictures the results that would follow upon the enactment, in New York State, of a law requiring the use of silver-nitrate solution for the prevention of purulent conjunctivitis in infants. He believes that it would immediately tend to lessen the number of children thus affected; and that the indirect effect would be good in sustaining the practitioners who use this method in spite of objectors. The indirect effect would also be good in condemning obstetricians who neglect its use, and by such omission run greater risks of adding to the number of blind children, nearly every one of whom, whether paupers or not, become burdens upon society in general and upon the State in particular. The fact that there is 33% more blindness in the country than in the cities is the strongest argument that Howe offers for pressing the adoption of the above law and its special enforcement in rural districts. Wielander³ states that if gonococci come in contact with flies' legs, they can be found on them 3 hours later in an active state. On this hypothesis only can he explain an epidemic of 33 cases of purulent conjunctivitis which he witnessed in a maternity some years ago. Wilson⁴ points out the danger of using towels in public places, as a means of conveying purulent conjunctivitis. His treatment of the disorder is to put the patient to bed, cleanse the eye every 15 minutes, and apply silver nitrate in 2% solution as often as the severity of the case demands. In this disorder in the new-born, Elze,⁵ after cleansing the lids, applies 1% to 2% solution of copper sulphate, and uses 5% ichthyol-salve 3 times daily. K. Hoor⁶ opposes Kalt's irrigation-method for conjunctivitis of the new-born, first, because no instrument ought to be inserted between the conjunctival surfaces during the course of the disease; and second, because too much moisture favors maceration of the corneal epithelium, with all its dangerous possibilities. A. Darier⁷ considers protargol in 5% solution practically a specific against purulent conjunctivitis; and Furst⁸ uses the same remedy in 10% solution for personal application and 5% solution for use at home. Pergus⁹ also likes protargol in this disorder. Pukaloff's¹⁰ preference is for calomel, to be dusted into the eye (which has been previously washed out with 2% boric-acid solution), morning and night, for 3 or 4 days; and S. D. Risley¹¹ has found a 10% ointment of the milky juice of the cassaripe plant to be of marked service in purulent diseases of the conjunctiva accompanied by corneal ulcers. Fernandez¹² reports that purulent conjunctivitis in Cuba presents much the same features as in North America and Europe, save that it is more benign. Anemia is quite common among pregnant women in Cuba, predisposing them to leukorrhea, from which it would seem logical to conclude that purulent conjunctivitis

¹ Brit. Med. Jour., June 18, 1898.

² Buffalo Med. Jour., Mar., 1898.

³ Pediatrics, Feb. 1, 1898.

⁴ Va. Med. Semi-monthly, Feb. 11, 1898.

⁵ Woch. f. Therap. u. Hyg. d. Auges, Nov. 11, 1898.

⁶ Klin. Monats. f. Augenh., July, 1898.

⁷ Ophth. Klinik, Nov. 7, 1898.

⁸ Fortsch. d. Med., No. 4, 1898.

⁹ Klin. Monats. f. Augenh., Apr., 1898.

¹⁰ Brit. Med. Jour., Aug. 7, 1898.

¹¹ Phila. Med. Jour., Oct. 29, 1898.

¹² Rec. d'Ophthal., May, 1898.

is more prevalent in Cuba; but his statistics do not bear out this assumption. His treatment is practically that everywhere in vogue. In spring catarrh of the conjunctiva, which is a cousin-germane to trachoma, R. L. Randolph¹ uses a 20-gr.-to-the-oz. ointment of salicylic acid morning and evening, with massage, after instillation of cocain.

Bizarre Forms.—Despagnet² describes a form of conjunctivitis due to infection during the slaughtering of cattle. The inflammation is monocular, and consists in a glandular swelling of the conjunctiva and granulations of the eyeball and lids, which on pressure exude pus. [This would seem to ally the disorder to ordinary purulent conjunctivitis.] The cornea remains unaffected. Enlargement of the parotid and cervical glands sometimes occurs. With iodoform-salve and hot compresses locally, and quinin internally, the disease generally disappears in about 2 weeks. Natanson³ calls attention to ophthalmia caused by caterpillars, the toxin being formic acid.

Trachoma.—V. L. Matkovic⁴ examined in every possible way 9166 cases of trachoma (1500 of which were complicated with corneal affections), in order to discover whether there is any accountable pathogenic microbe or not. He came to the conclusion that there is none, but that the morbid entity of trachoma has a histology which is characteristic and absolutely different from that of follicular conjunctivitis. In searching for channels of contagion he analyzed the lacrimal secretion, and found essential differences between the tears of the healthy and those of the weak and scrofulous, a maximum alkalinity characterizing the tears of those living under favorable hygienic conditions; while a minimum alkalinity was noticed in the tears of the weak and debilitated. He claims that lessening the alkalinity of the lacrimal secretion tends to the acquisition of conjunctival diseases. O. Sissin⁵ thinks we are justified in believing that bacteria are one of the chief etiologic factors in diseases of the eye, and particularly trachoma.

In an animated discussion on trachoma, at the twelfth meeting of the International Medical Congress, J. Hirschberg⁶ gave a list of the German towns in which it is prevalent, and discussed the preventive and curative measures that should be adopted for its suppression. In the more serious cases surgical proceedings are required; whilst in the slighter cases the usual remedies, such as copper-sulphate and silver-nitrate, are sufficient. He, as well as Nenadovic, thought that with Government aid and the enlightenment of the public mind in regard to the importance of ablutions and the use of pure water, the disease, like leprosy, might be stamped out in Europe. Knapp and Dohnberg recommend for the expression of the trachomatous granulations the use of modifications they have devised of the forceps, which can be very readily and effectively applied; whilst a special form of crayon made of caoutchouc has been suggested for the same purpose by Debagory-Mocriévitch. Another mode of treatment of this troublesome affection is the application of solution of potassium iodid practised by Roselli, with the immediately subsequent application of oxygenated water. Darier removes the granulations, if few in number, with scissors; if numerous, by careful curettage. Nissnamov employs a saturated solution of iodine in ether; others, itrol or silver citrate, or formol; others, again, resort to galvanocautery; whilst Germann believes that in many instances the focus of the disease is situated in the lacrimal sac, which must sometimes be extirpated to effect a permanent cure. Attention may be called to the recently issued blue-book, which contains a

¹ Brit. Med. Jour., Jan. 8, 1898.

² St. Petersburg. med. Woch.

³ Jour. Am. Med. Assoc., Sept. 24, 1898.

⁴ St. Louis M. and S. Jour., July, 1897.

⁵ Rec. d'Ophthal., Feb., 1898.

⁶ Lancet, Dec. 25, 1897.

report by Sidney Stephenson on the "Ophthalmic State of Poor-law Children," in which will be found an excellent summing-up of the methods adopted in England for the prevention of the spread of this disease, including the arrangements that should be made for class-rooms, dormitories, infirmaries, and for general and local hygienic treatment.

In the medicinal treatment of trachoma, E. Neese¹ prefers the long-continued instillation of 1% to 2% solution of creolin. For the early vascular stages Eberson² recommends tri-weekly pencilling of the lids with the following: Ichthyol, 50 gr.; distilled water, 40 gr.; glycerin, 10 gr.; to be discontinued as soon as the vascularity has subsided. Wolffberg³ prefers rubbing the conjunctiva with wads of cotton saturated with 1:2000 sublimate solution, in which preference he is joined by Bergel.⁴ In old trachomas, A. Darier⁵ has even dusted pure protargol into the eye, followed by massage, without any untoward result. He says that this new drug is not only efficient, but is also absolutely harmless. Protargol is a loose organic combination of silver with protein, and is freely soluble in water. [From which it would seem that its effects are due to the double action of the protonuclein and silver. All the reports thus far are singularly unanimous in lauding the drug in a most extravagant way.] H. Kuhnt's⁶ experience with 3300 cases of trachoma in Prussia leads him to advocate the therapeutic management of trachoma, reserving surgery for those cases (probably 40%) rebellious to medicines; while U. Hellgren,⁷ as the result of a close study of 161 cases, is unreservedly in favor of the expression-treatment as practised with Knapp's roller-forceps. Pulido⁸ thinks that electrolysis is not any more effective in hastening the cure of trachoma than many other simpler means now at our command.

Tubercle.—That conjunctival tuberculosis may closely simulate trachoma is well shown by H. Heimersdorff's⁹ case, in which microscopic examination of a piece of the conjunctiva was necessary before an exact diagnosis could be made.

Syphilis.—Three more cases of primary sore of the conjunctiva are put on record by W. Dagilaiski.¹⁰

Concretions.—E. Fuchs¹¹ says that concretions in the conjunctival tissue are not infrequent, and that they represent the terminal degeneration of secretions which have become encysted. A. Peters¹² insists that many of the milder forms of conjunctivitis are only symptomatic of some latent refractive or muscular error.

Trauma.—H. G. Stutzer¹³ recites the case of a boy, 5 years old, who was bitten in the right lower lid by a dog. The wound healed kindly, but 6 weeks later an inflammation developed involving the preauricular and the sub-maxillary glands. Examination of a section of the conjunctiva proved the affection to be tuberculous in nature, and excision of the tuberculous area and the preauricular glands brought about entire cure. In lime-burns of the eye Gossart¹⁴ neutralizes the lime with a few drops of a 50% solution of sugar and water, which forms a neutral saccharate of lime. [Unfortunately the damage is done at the moment of the contact of the lime with the tissue, and neutralization is therefore useless.]

¹ Centralbl. f. prakt. Augenh., Mar., 1898.

² Woch. f. Therap. u. Hyg. Auges, Mar. 24, 1898.

³ Ophth. Klinik, No. 7, 1898.

⁴ Mittheil. a. d. Augen. d. Carolin., med.-chir.

⁵ Ann. of Ophth., July, 1898.

⁶ Ibid., Jan., 1898.

⁷ Sammlung z. abh. a. d. Geb. d. Augenh.,

⁸ Beiträge z. Augenh., Jan., 1898.

⁹ Ibid., Apr., 1898.

¹⁰ Ibid., Apr. 7, 1898.

¹¹ Klin. Monats. f. Augenh., Mar., 1898.

¹² Inst., Stockholm, 1898.

¹³ Klin. Monats. f. Augenh., June, 1898.

¹⁴ Graefe's Archives, vol. xlv., July 19, 1898.

¹⁵ Band ii., Heft 7, 1898.

¹⁶ New Orl. M. and S. Jour., May, 1898.

Pigment.—C. H. A. Westhoff¹ refers to a 77-year-old woman who presented blue-black pigmentation of the conjunctiva at all points within the interpalpebral fissure where it was exposed. Silver nitrate had not been used.

Pterygium.—H. Lopez² discusses pterygium under the heads of true and false. The former always originates in pinguecula, and advances slowly until it reaches the corneal summit; the latter is the result of attachment of normal conjunctiva to ulcerous or wounded corneas, is stationary, and may assume different shapes. He believes in extirpating the growth and strangulating the stump by a double suture. H. M. Starkey,³ however, uses electrolysis in the early stages of pterygium, in a strength of 3 ma., inserting the needle (connected with the positive pole) at right angles to the axis of the growth.

New Growths.—A cavernous angioma was found by H. O. Reik⁴ near the inner canthus in the bulbar conjunctiva of a 16-year-old colored boy. The growth was removed and the diagnosis later verified by the microscope. Kopff⁵ reports an epithelioma of the conjunctiva, and S. B. St. John⁶ a spindle-cell sarcoma of the cornea and conjunctiva; both of which were successfully removed. K. Joerss met with a tumor which, on removal and microscopic examination, proved to be a subconjunctival sarcoma.⁷ Four years later there was not a trace of recurrence or metastasis, notwithstanding that the patient was 62 years old.

DISEASES OF THE LACRIMAL APPARATUS.

A. Foucher⁸ reiterates his statement, made 7 years ago, that while there exist numerous causes of **dacryocystitis**, its principal element lies in the unhealthy constitution of most subjects of such disorders. He bases his statement on a close study of 183 cases. H. Truc,⁹ in the treatment of the dry form of blepharitis, pays particular attention to the condition of the lacrimal apparatus. He has found that many obstinate cases have their origin in a latent stricture of the lacrimal canal, and he obtains unusually quick results by reestablishing the normal passage of the tears with probes and lavage. Admitting the dependence of many forms of acute or moist blepharitis upon hypertrophies and inflammations of the nasal mucous membrane, he feels that nasal treatment is particularly efficient in those cases in which lacrimal obstruction has been suspected, and reports the cure of a number of such cases of long standing. P. Bettremieux¹⁰ treated an obstinate case of *tie douloureux* by attention to the lacrimal passages, and found that the pain originated in closure of the lacrimal duct, and disappeared promptly on restoration of the function of the duct. S. D. Risley¹¹ argues that indiscreet slitting of the inferior canaliculus is a violation of physiology. He discountenances too ready surgical treatment of epiphora and other lacrimal disorders, except in carefully selected cases, and believes much can be accomplished by medical treatment after dilating the canaliculus. M. Black,¹² on the other hand, advocates operative methods, and has had unusual success in the treatment of lacrimal affections by opening the upper canaliculus and then using the largest possible probes. Once weekly he electrolyzes the mucous membrane of the duct, by attaching the negative pole of a galvanic battery to the end of the probe and placing the

¹ Centralbl. f. prakt. Augenh., Aug., 1898.

² Jour. Am. Med. Assoc., Sept. 17, 1898.

³ Rec. d'Ophthal., May, 1898.

⁴ Beiträge z. Augenh., Jan., 1898.

⁵ Rec. d'Ophthal., Oct., 1897.

⁶ Jour. Am. Med. Assoc., Oct. 1, 1898.

⁷ Knapp's Archives, May, 1898.

⁸ Ann. of Ophth., Oct., 1897.

⁹ Tr. Am. Ophth. Soc., 1898.

¹⁰ Brit. Med. Jour., Jan. 8, 1898.

¹¹ Arch. d'Ophthal., Sept., 1897.

¹² Ibid., Oct. 8, 1898.

positive pole in the patient's hand. The current-strength is about 3 ma. H. O. Reik¹ also advocates large probes (Nos. 12 to 16), and claims to cure 95% of cases if they persist in treatment. F. Allport² believes that 80% of such cases are of nasal origin; while L. Connor³ sums up the whole matter by urging recognition and treatment of any underlying constitutional disorder, removal of all eye-strain, investigation of the nasal passages, and, finally, cultivation of a perfect technic in the matter of lacrimal instrumentation.

Actinomycosis, giving rise to a small concretion in the upper canaliculus of a 37-year-old Russian woman, is reported by K. Kastalsky.⁴

Polyp.—A pedunculated fluctuating polyp of the superior canaliculus, one of the rarest of eye-diseases, was successfully removed by O. Parisotti.⁵

AFFECTIONS OF THE CORNEA.

Opacity.—W. Frank⁶ speaks of having seen permanent superficial opacities in a young man who worked several hours daily over fumes of nitronaphthalin. Frank was able to exclude all other possible factors, and attributed the corneal trouble directly to the fumes. I. Malgat⁷ is not in favor of iridectomy for optical purposes in children whose corneas are opaque; but advocates the use of yellow ointment, followed by massage through the closed lids for 30 seconds, afterward washing the eye with boric-acid solution. This treatment is repeated daily until the eye is injected, and then discontinued, to be renewed when the irritation disappears. He reports cases of 112 children with leukomas of different extent and depth, of which 91 were cured, 11 improved, and 10 did not continue treatment. M. Black's⁸ experience in clearing up leukoma with subcutaneous injections of thiosinamin has been so successful that he cordially recommends it for trial.

Congenital Interstitial Keratitis.—The discharge, swelling of the lids, and photophobia occurring in a new-born infant suggest purulent ophthalmia; but in congenital inflammation of the deep layers of the cornea, Hansell⁹ says that close inspection will show the absence of pus-corpuscles in the discharge, extensive edema of the bulbar conjunctiva, and diffused opacity of the cornea, without ulceration. The prognosis is favorable when treatment is directed toward securing proper food and hygiene, rather than to the eyes. [Doubt no longer exists as to the influence of acquired syphilis in the causation of interstitial keratitis. Its manifestations are in nowise dissimilar to the congenital form, and can be classified only according to the history.] Trousdale¹⁰ reports 11 such cases.

Ulcer.—Edsall¹¹ lays great stress upon nasal catarrh as the cause of many cases of corneal ulcer, and advises that treatment be directed to the nares as frequently as to the eyes. In the treatment, J. Griffith¹² urges the importance of nourishment. He says: "diminish the carbohydrates; increase the nitrogens."

Ulcer and Hypopyon.—W. A. Holden,¹³ in the discussion of J. Green's and A. E. Ewing's¹⁴ case, opposed the idea that pus passed from the cornea into the anterior chamber, and cited experiments to prove that just the reverse happened—namely, that pus-cells found in the cornea had been deposited there

¹ Jour. Am. Med. Assoc., Oct. 8, 1898.

² Ibid.

³ Ibid.

⁴ Beiträge z. Augenh., Jan., 1898.

⁵ Rec. d'Ophthal., Mar., 1898.

⁶ Beiträge z. Augenh., xxxi., Apr., 1898.

⁷ Rec. d'Ophthal., Mar., 1898.

⁸ Ophth. Rec., Oct., 1898.

⁹ Tr. Am. Ophth. Soc., 1898.

¹⁰ Presse méd., No. 40, 1897.

¹¹ Pacific Med. Jour., Sept., 1897.

¹² Treatment, Dec. 9, 1897.

¹³ Knapp's Archives, Mar., 1898.

¹⁴ Tr. Am. Ophth. Soc., 1898.

secondarily. He believes that the break in Descemet's membrane always begins with changes in its posterior surface (Fig. 79). Green attributed the cure that

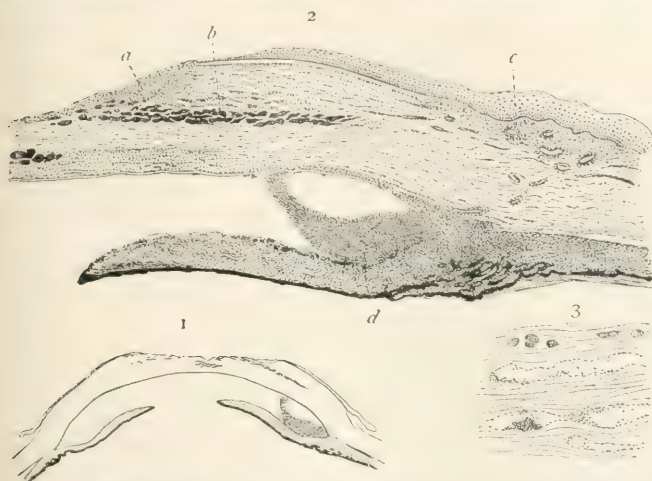


FIG. 79.—1, a diagram of a section through the anterior segment of the eye, passing through the ulcer a short distance from its center; the black markings in the cornea represent colonies of pneumococci. 2, a drawing of a section through the inferior half of the anterior segment of the eye; a, the sloughing margin of the ulcer; b, colonies of pneumococci; c, epithelial and conjunctival vessels; d, hypopyon; hematoxylin-eosin. 3, interlamellar lymph-spaces with spreading colonies of pneumococci; to the right a number of leukocytes (Holden, in Knapp's Archives).

followed to the use of hydrogen dioxide in full strength. Schmidt-Rimpler¹ prefers the galvanocautery in rodent ulcer. He is supported in this view by Vassius,² Pflüger,³ and C. S. Rodman.⁴

Herpetic Keratitis.—Galezowski⁵ traces the origin of many cases of herpes of the cornea to affections of the fifth nerve [the originality and interest of this observation lie in the demonstration of the involvement of the nerve], which controls the nutrition and vitality of the cornea. The cornea is exceedingly rich in nerve-supply, having, according to Ranvier, 4 plexuses, subepithelial and intraepithelial, in the stroma and under Bowman's membrane, of which the first is of the greatest importance. Galezowski classifies herpes according to its clinical varieties, as follows: (1) That following influenza and fevers; (2) malarial; (3) neuroparalytic—(a) from central cause and (b) from syphilis (van Millingen adds, from congenital absence of the first and second branches of the fifth pair); (4) eczematous. His treatment comprises an ointment of iodoform, 0.10 ggm.; vaselin, 10 ggm.; cocain, 0.02 ggm.; eserine and duboisin alternately; and consideration of the underlying cause. Panas⁶ resorts to the thermocautery in the presence of severe pain, going down to the corneal stroma and destroying the exposed nerve-plexus.

Conical Cornea.—In the treatment of this affection G. A. Critchett⁷

¹ Proc. German Ophth. Congress, Aug., 1898.

² Ibid.

³ Ibid.

⁴ Med. Rec., 1897.

⁵ Rec. d'Ophthal., Apr., 1898.

⁶ Med. Bull., Apr., 1898.

⁷ Tr. Ophth. Soc. United King.; Brit. Med. Jour., May 14, 1898.

has been successful with the galvanocautery, by making 3 applications, the first with the lowest possible heat, then a smaller area with greater heat, and finally a central dot of white heat. [This report would have been more accurate had Critchett designated the number of ampères needed for each application.]

DISEASES OF THE LENS.

Congenital Diseases.—Thompson¹ puts on record an instance of what is practically a double lens, produced by cystic dilatation of the hyaline canal just behind the lens, and having all the properties of a lens. "The distinct nature of the cyst and its differentiation from posterior lenticonus were shown by its position in the parallax and by the position of the spot when viewed obliquely, showing a convex and not a concave surface." M. Gunn,² in discussing Thompson's paper, spoke of having seen a similar condition in a child. Another family of cataracts is reported, this time by J. W. Barrett.³ The family consists of the mother, who has double cataract, and of five children, four of whom have double cataract, while the youngest child enjoys normal vision. Operations performed on these children and their mother were not uniformly successful, the resulting vision being far less than the average. [Just such a family history (not yet reported) has come to our own notice, the family consisting of the mother and 6 children, 5 of whom present bilateral cataract. Operation on the 10-year-old child, while perfect from the surgical standpoint, really improved the boy's sight very little at first, even with a + 12 D. S., compelling the assumption that impressions were received on his retinas, but practically got no further because his brain had not learned properly to translate the impressions. This assumption was in part borne out by the fact that he began to see much better within 3 months, when he disappeared from observation.]

Origin of Cataract.—W. F. Mittendorf⁴ has observed that the great majority of cases of senile cataract appear first in the inner lower quadrant of the lens. He attributes the earliest involvement of this portion of the lens to the constant accommodation for near objects requiring at the same time forced convergence and downward rotation of the eyes. S. D. Risley⁵ stated that this region of the lens was the part least protected, and he saw in that fact sufficient reason for the appearance of opacities first in the inner lower quadrant. E. Jackson⁶ states that those senile cataracts not due simply to age are to be ascribed to errors of refraction, to acute disease, and to uncorrected presbyopia. He also finds that opacities of the lens are to be found in 77% of all persons over 75 years of age. The premature cataract of glass-blowers is attributed by Hirschberg⁷ to the long-continued exposure of the transparent lens to heat-rays, inducing fine changes in the lens-fibers that ultimately result in lenticular opacities.

Immature Cataract.—C. Berek⁸ extracts immature cataracts, and does not wait until the lens is wholly opaque. He performs iridectomy, and is persuaded that the old method of operation only on naturally mature cataracts entails needless mental suffering on the patient. [Our own method is to wait only until vision in the better eye has been reduced to such a degree that the patient is incapacitated for his occupation.] J. Widmark⁹ triturates all unripe

¹ Brit. Med. Jour., Aug. 20, 1898.

² Intercol. Med. Jour. Austral., July 20, 1897.

³ Ibid.

⁷ Centrallbl. f. prakt. Augenh., Apr., 1898.

⁹ Mittheil. a. d. Augen. d. Carolin. med.-chir. Inst., Stockholm, 1898.

² Ibid.

⁴ Tr. Am. Ophth. Soc., 1898.

⁶ Jour. Am. Med. Assoc., Sept. 24, 1898.

⁸ Am. Jour. Ophth., May, 1898.

cataracts in patients under 60 years of age, and does direct extraction of all over that time of life. Necessarily, dissection is much oftener required than after extraction of a naturally mature cataract.

Simple Extraction.—St. John Roosa¹ says that simple extraction can be performed in 99% of all cases [this is a most extravagant estimate]. Preliminary iridectomy on account of immature cataract, irreducible iris-prolapse, and extraction of the lens in its capsule in very old people, constitute the exceptions to simple operation [and these will surely aggregate more than 1% of all cataract-cases presenting for treatment]. He finds that infection occurs mainly from the eyelashes. Schweigger² continues to urge the virtues of simple extraction when combined with downward section of the cornea [the facts set forth in his paper are well worth investigation].

Modifications.—Angelucci³ modifies simple extraction by grasping the conjunctiva, Tenon's capsule, and the tendon of the superior rectus firmly with fixation-forceps, and then making the corneal incision and the capsulotomy all in one cut. He claims that the cut is thus more easily made, and that danger of prolapse of the iris or vitreous is thus lessened. Iridectomy, he considers, is

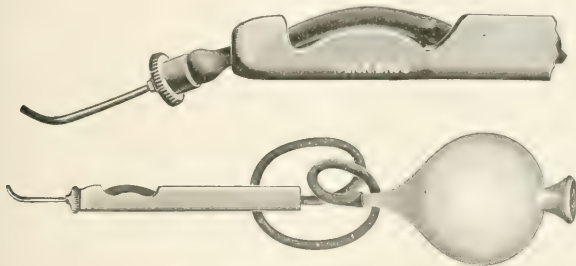


FIG. 80.—Lippincott's modified syringe.

always unnecessary. J. A. Lippincott⁴ still believes in washing out the cortical remains of the lens after cataract-extraction, and has modified his syringe for that purpose (introduced in 1889), so that it can be rendered aseptic by boiling. In E. Jackson's⁵ opinion, the greatest breaking up of the lens with the least escape of lens-matter into the anterior chamber in dissection-operations is obtained by making the rent in the capsule small, and yet allowing free movement of the needle within the lens. This can be done only by making the opening in the capsule close to the opening in the cornea. In dividing a tough capsule in secondary operations the reverse obtains—namely, making the opening in the cornea as far as possible from the membrane by inserting the needle in the limbus of the cornea [a nice point in technic].

After-treatment.—J. Hjort⁶ reiterates his argument of a year ago, that the open-wound after-treatment of cataract is the rational and physiologic method, and offers the statistics of 100 consecutive cases⁷ treated by this method without suppurative healing. His contention is, that while the corneal wound is open the aqueous humor takes care of any invading microbes; and that when it is closed the stream of tears keeps the site of the incision so

¹ Post-Graduate, Dec., 1897.

³ Ophth. Klinik., No. 6, 1898.

⁵ Am. Jour. Ophth., Jan., 1898.

² Knapp's Archives, May, 1898.

⁴ Ophth. Rec., Aug., 1898.

⁶ Centralbl. f. prakt. Augenh., Nov., 1897.

⁷ Ibid., Feb., 1898.

flushed that no microorganisms can gain a foothold in the half-closed corneal tissues. He further believes in the bactericidal nature of the tears. In line with this argument is the history submitted by W. Reber¹ of a patient whose one eye was operated under strict asepsis and afterward bandaged several days, with subsequent purulent infection, and long-delayed but finally successful healing after 56 days. The other eye was operated under absolutely identical conditions, and closed afterward with a strip of sterilized adhesive plaster, which was removed on the third day, and the eye was healed by the twelfth day, with corrected vision of $\frac{6}{10}$. Reber does not draw conclusions from his case, but evidently feels that there is much about the open method to commend it for eyes that do not tolerate bandaging. J. Borthen's² experience, in 20 extractions during 1 year with Hjort's method, convinces him that it represents a decided advance in the after-treatment of cataract.

Delayed Healing.—Long-delayed healing of the corneal wound after extraction of cataract is not uncommon, and is not necessarily dangerous to the sight. For instance, G. C. Harlan³ speaks of a case in which union was delayed for 20 days, and finally took place, with resulting good vision. G. Valois's case of retarded union is of interest in this connection. He operated on an alcoholic, and the wound was not closed on the tenth day,⁴ which fact he attributes to the alcoholism, as the wound was not infected nor inflamed. It had been bandaged and the edges were in apposition, excepting that between them could be seen a small, dark substance, which the author believed to be a hernia of the capsule. This was therefore reduced, notwithstanding which the anterior chamber had not re-formed 2 days later. The cautery was then applied to the edges, which stimulated them to unite.

Accidents and Losses.—Of 5 losses by J. W. Barrett⁵ in 100 extractions, 3 were due to panophthalmitis (1 traumatic), and the 2 others occurred in patients suffering from trachoma. Pain and complicated healing following cataract-extraction in malarial subjects are said by Bentejac⁶ to be relieved by liberal doses of quinin.

Postoperative Hemorrhage.—DaGama Pinto⁷ comments on several cases of profuse intraocular hemorrhage after cataract-extraction, and inclines, with Noyes, to the belief that preliminary iridectomy affords some, although not absolute, protection against this disastrous consequence. With this view Wadsworth⁸ is in entire accord, as the result of his experience in 3 recent cases. Bloom,⁹ working at this subject from the other (anatomic) end, found that local changes in the choroidal veins was the lesion predisposing to post-operative hemorrhage within the eye.

Dislocations.—In removing a spontaneously dislocated lens from the anterior chamber, F. Despagne¹⁰ fixes the lens with a discission-needle and then extracts it through a cut in the lower segment of the cornea. In another variety of dislocated lens (into the vitreous), J. W. Barrett¹¹ fixed the lens while the patient was lying on his face. The patient was then turned on his back, and extraction without iridectomy was done.

Secondary Cataract.—It is the opinion of Wicherkiewicz¹² that the entire absorption of cloudy lens or capsule-remains may often be accomplished by the use of 5–15 gr. of potassium iodid, 3 times daily, for several weeks

¹ Phila. Polyclinic, Nov. 5, 1898.

² Tr. Am. Ophth. Soc., 1898.

³ Intercol. Med. Jour. Austral., Nov. 20, 1897.

⁴ Ann. of Ophth., Oct., 1897.

⁵ Graefe's Archives, July 19, 1898.

⁶ Intercol. Med. Jour. Austral., Oct. 20, 1897.

⁷ Woch. f. Therap. u. Hyg. d'Augs, Sept. 8, 1898.

⁸ Klin. Monats. f. Augenh., Aug., 1898.

⁹ Rec. d'Ophthal., Jan., 1898.

¹⁰ Rec. d'Ophthal., No. 9, 1897.

¹¹ Boston M. and S. Jour., Sept. 3, 1897.

¹² Rec. d'Ophthal., Apr., 1898.

after the extraction. He is sure that by this means he has avoided the necessity for needle-operations in many instances. König¹ does not wait for the appearance of secondary capsular opacities, but immediately after expulsion of the lens he makes a crucial incision through the posterior capsule with a needle-knife that is a little larger in its blade than the ordinary cystotome. The speculum is always removed before this maneuver, to avoid escape of vitreous. In pointing out the lessons to be learned from his last 70 cases operated for secondary cataract, Knapp² states that in 95% of all cases discission is to be preferred to all other methods of handling secondary cataracts. In his 70 cases he secured improvement of vision in 64, in 5 it remained the same, and in 1 it was somewhat reduced. He continues to urge discission as justifiable, but warns against the slightest pulling or tearing with the discission-needle. The knife-needle to cut with, and an ordinary discission-needle to fix with, are the safest precautions against secondary glaucoma after such procedures. He records one very interesting illustration³ of artificial glaucoma after discission that finally resulted in fair vision after a long fight. [This is by far the most valuable contribution to our knowledge of this subject we have had in the last 4 or 5 years.]

DISEASES OF THE IRIS.

Congenital.—As an explanation of the various congenital arrests of development of the iris, W. C. Posey⁴ believes that they are to be ascribed to the defective formation of the wheel-like fetal circle of vessels from which the iris is later built up. Should any one of the radiating loops fail to develop, it will show itself postnatally as a coloboma. Failure of the whole circle to develop fully reveals itself in the new-born subject as aniridia (Plate, 10).

Physiology.—Nuel⁵ claims that the reason investigators have thus far failed to show that considerable absorption of aqueous humor occurs by way of the anterior surface of the iris lies in the fact that their experiments were largely limited to rabbits, whose iris lymph-apparatus is entirely rudimentary. With the microscope he has followed the absorption of India-ink by the iris of dogs and cats 4 hours after injection into the vitreous body, from which he postulates that there can be little doubt that in man also the orifices in the anterior surface of the iris and the interstitial clefts into which they lead have the function of absorbing the aqueous humor.

Mydriatics and Myotics.—Spiro's⁶ clinical study of the action of mydriatics and myotics on 12 cases of total oculomotor palsy shows that atropin widened the pupil an additional 1 mm. to 1½ mm., which fact he attributes to the action of the mydriatic on nerve-ends and -fibers that were not completely paralyzed, rather than to its influence on the sympathetic nerve. Eserin produced maximal contraction in 10 minutes.

Pupils.—Fränkel⁷ classifies pupillary inequality as organic, functional, and physiologic. Organic inequality is the expression of a direct or indirect lesion of either the third nerve or the sympathetic. Functional inequality depends upon some indirect action on the sympathetic; while physiologic inequality is congenital, and not dependent on any known condition. W. M. Leszynsky's⁸ study of his own case of unilateral reflex iridoplegia leads him to conclude that it may arise in tabes or parietic dementia; that it also is found

¹ Proc. Soc. d'Ophtal. de Paris; Rec. d'Ophtal., Apr., 1898.

² Tr. Am. Ophth. Soc., 1898.

³ Ibid., Oct., 1897.

⁴ Centrallbl. f. prakt. Augenh., Mar., 1898.

⁵ N. Y. Med. Jour., July 30 and Aug. 6, 1898.

⁶ Arch. of Ophth., Sept., 1898.

⁷ Brit. Med. Jour., Aug. 20, 1898.

⁸ Am. Jour. Med. Sci., Feb., 1898.

in cerebral syphilis, and may be permanently limited to one eye; that it often occurs as a remote result of disease of the third nerve and its nucleus, and may be the only demonstrable clinical evidence of a preexisting nerve-paralysis; that it is always indicative of central nerve-degeneration; that it is generally syphilitic; and that the lesion is usually situated in the centrifugal fibers.

Gout.—The long string of cases reported by R. Sattler¹ only tends to strengthen the position of those who argue the endogenous origin of most inflammations of the iris. Sattler himself is convinced that the iritis occurring in rheumatic or gouty individuals is nothing but the anterior expression of a process involving the whole uveal tract.

Syphilis.—The case-history submitted by F. W. Lester² is not without interest. It describes a traumatic iritis bringing in its train a whitish exudate in the vitreous, both of which were at first thought by the author to be traumatic. However, on diplomatically leading up to the point, it was found that the man was a syphilitic, and after energetic treatment by mercury and iodid the exudate was entirely absorbed. "The case teaches that, in iritis, one should inquire early for syphilis."

Gonorrhea.—Stimulated by Knies's statement that gonococci could not withstand a temperature of 102° F. for 12 hours, Eck³ tried the method for 14 days on a patient with pure gonorrheal iritis. The man could not stand more than 6 or 8 hours of it at one time, and at no time did the body-temperature rise to 102° F. Moreover, the iritis relapsed a few days after the baths were discontinued. Despite the anemic appearance of the patient, the red blood-corpuscles increased 40% during the treatment, while the hemoglobin remained at 95%. Eck says that, theoretically, Knies may be correct, but that direct destruction of the gonococci by his method is not attainable in ordinary practice.

Recurring Iritis.—E. E. Jack⁴ prefers iridectomy to all other measures in those cases of relapsing iritis secondary to occlusion of the pupil and iris bombé. He says that the attacks of pain may be thus relieved or prevented.

Tuberculosis.—Among 80 cases of iritis proved by microscopic examination or inoculation to be tuberculous, Rudolf Denig⁵ found no simultaneous tuberculosis of the body in 71 (!), although 27 were suspicious and 4 presented signs of previous tuberculosis of other organs. He believes that when a tuberculous process attacks either the iris or the choroid it generally remains localized, and he therefore hesitates to perform enucleation.

New Growths.—Up to the present time sarcoma of the iris has had a literature of 46 cases, to which C. E. Veasey⁶ adds another, concerning a 46-year-old man, who presented a small isolated growth of the iris, which was successfully removed by a broad iridectomy. The diagnosis of sarcoma was afterward fully substantiated by microscopic examination. [Compare with Ewetzky's report in section on Choroid, in this volume.]

DISEASES OF THE CHOROID.

Diseases of the choroid, pure and simple, have been only very lightly touched on during the past year, the tendency being to describe at great length many conditions that are really secondary to choroidal changes. For instance,

¹ Med. News, Jan. 22, 1898.

² Albany Med. Ann., Jan., 1898.

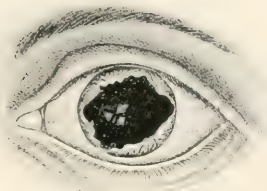
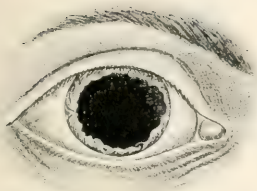
³ Woch. f. Therap. u. Hyg. d. Auges, Mar. 7, 1898.

⁴ Boston M. and S. Jour., May 26, 1898.

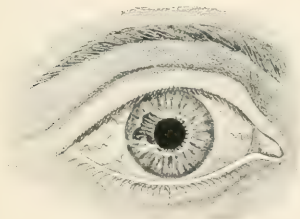
⁵ Allg. Wien. med. Zeitung, Heft 42.

⁶ Ann. of Ophth., Oct., 1897.

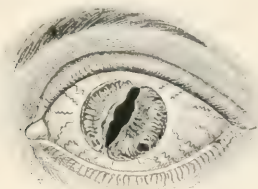
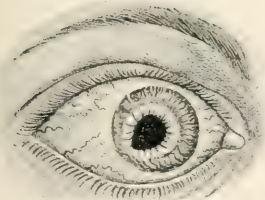
PLATE 10.



Partial aniridia.



Pseudocoloboma of iris.



Corectopia; slit-shaped pupil.

(W. C. Posey, in Arch. of Ophth.)

Richard Ellis¹ devotes a long discussion to **vitreous opacities**, and says, in conclusion, that they may be ascribed to alterations in the structure of the choroidal vessels or in the character of the blood within these vessels; also to changes in the tension of the vessels of the choroid, the retina, or the ciliary body. R. F. LeMond² claims that **faradism** is pronounced in its favorable influence on choroiditis and vitreous opacities. [LeMond's description of his method is so indefinite that it is difficult to pass judgment on it, or to accept his conclusions. He applies the positive pole to the eye and uses from 5 to 10 cells. Unfortunately, the amount of current cannot thus be measured. If, as he claims, each cell can produce a current of 5 ma., the strength would be unbearable, as 5 ma. are rarely borne even by stoical patients.]

Uvea and Nose.—W. C. Posey³ gives in full the details of a case of metastatic uveitis in both eyes, with temporary blindness, resulting from an intense purulent inflammation of the frontal, ethmoidal, and accessory sinuses; and Fromaget and Ulry⁴ recite the details of a recurring serous iridochoroiditis, which it was finally discovered undoubtedly proceeded from reflex irritation induced by a badly decayed and painful upper canine tooth on the same side as the affected eye. [We have oftentimes wondered whether there was not a closer relation between the superior and the other divisions of the fifth nerve than would appear from the infrequent reports of such conditions in the literature.]

Tumors.—F. LaGrange⁵ describes the clinical and microscopic features of a metastatic carcinoma of the choroid. The patient, a 48-year-old woman, had had a malignant tumor removed from the left breast 3 years before the appearance of any eye-symptoms, and a second operation had been necessary shortly afterward. Failure of vision was the first eye-symptom, soon followed by injection of the conjunctiva, increase of tension, irregular dilatation of the pupil, hypersensitiveness of the cornea, and the appearance of a reddish nodular neoplasm in the iris. Further, the vitreous was turbid and the retina completely detached. Enucleation was done mainly for the relief of the glaucoma-pains: but the patient died 3 months later, from a cachexia the result of a secondary tumor of the spinal cord. Th. Ewetzky⁶ makes a masterly contribution to the subject of intraocular sarcomata, in particular those of the uvea. In it he brings together the histories of 49 cases of sarcoma of the iris (which he had previously collated), to which he adds another from his own experience, and 10 cases from the literature since his last report, making a total, up to date, of 60 cases.

SYMPATHETIC OPHTHALMIA.

Theories.—[Recent contributions to our literature have brought very little knowledge of practical value additional to that already accepted concerning the channels of communication through which the germs of a destructive inflammation of the diseased eye are conveyed to the healthy eye. The articles that have been published (and their number is large) have been devoted to a discussion of the theories already advanced, with the aim of determining, through clinical and microscopic evidence, which theory will bear the closest scrutiny and consistently respond to the demands made upon it.] C. E. Shaw⁷ seems to sum up not only his own, but also the prevailing

¹ N. Y. Med. Jour., Oct. 16, 1897.

² Jour. Am. Med. Assoc., Sep. 17, 1898.

³ Ibid., Jan. 22, 1898.

⁴ Rec. d'Ophthal., Mar., 1898.

⁵ Ann. d'Oculist., Jan., 1898.

⁶ Graefe's Archives, vol. xlv., No. 3, June 17, 1898.

⁷ Brit. Med. Jour., June 18, 1898.

opinion, when he concludes (after carefully considering (1) Deutschmann's theory of migration of germs through the channels of the optic nerves as the cause of sympathetic inflammation; (2) the claims of others whose experiments along the same lines as Deutschmann's have brought forth contradictory evidence; and (3) from experiments of his own) that the migration-theory is untenable, and "that we must go back to the old explanation—namely, the ciliary nerves." He further says, "it may be that the explanation lies in the anatomic and physiologic relationships of the nervous mechanism conveying the irritation of which we as yet know nothing," and believes "it is by the study of these relationships that our knowledge of the cause of sympathetic inflammation is most likely to be extended. There would seem to be a sound basis for Schmidt-Rimpler's theory that sympathetic inflammation is a ciliary neurosis, by which we understand that the elements of the nerve itself—the connective tissue, the white enveloping substance, and the axis-cylinder—are inflamed, as a result of which we see disturbed function of both the sensitive and the sympathetic nerve-fibers, of which the ciliary nerves are said to consist. [We further agree with] Moll,¹ who has recently made some experiments and is convinced that the foregoing theory is correct.

According to D. C. Bryant,² the operation of **enucleation** seems to be going out of fashion with some ophthalmic surgeons, and Mules's operation—the transplantation of a glass vitreous or of a silver or aluminium ball or framework—coming into vogue. However, Mules's operation has not become as yet general, more conservative operators having been deterred by 2 possibilities—namely, the expulsion in a few months of the ball (even after the case has been reported and exhibited as a success) and the danger of sympathetic inflammation, which, they claim, is not removed by Mules's operation. Cross³ substantiates this last objection by recording 2 cases following 17 and 21 days respectively after operation. He does not assert that the operation was the cause of the sympathetic inflammation, but simply states that it did not prevent it, as hoped and expected. The case of I. M. Ray⁴ would seem to prove that sympathetic inflammation may be originated by the operation of enucleation. He speaks of a child whose left eye was lost from purulent ophthalmitis secondary to infection, and enucleated 3 weeks later. In the course of the next 3 weeks the other eye became blind from sympathetic inflammation. But this is probably one of those cases sometimes attributed to the operation, but really inaugurated before brought to the notice of the surgeon.

Irritation from the wearing of an **artificial eye** over a shrunken and atrophied eyeball may give rise after many years to sympathetic inflammation. In 2 patients of G. Ferdinando⁵ it developed 21 years after injury in one and 14 years in the other.

A remarkable **medicinal cure** of a case of sympathetic ophthalmia [and one to which credence is with difficulty given] is that by Dor,⁶ who used an extract of the ciliary body of oxen in 2 cases, with the result of restoring useful vision to eyes that were almost blind!

GLAUCOMA.

Causes.—[There seems very little doubt that glaucoma, like many other affections of the eye (notably retinitis pigmentosa, optic-nerve atrophy, and errors of refraction), is hereditary; at any rate, the statement seems justified that the

¹ Centralbl. f. prakt. Augenh., Aug., 1898.

² Ann. d'Oculist., July, 1897.

³ Brit. Med. Jour., June 18, 1898.

⁴ Jour. Am. Med. Assoc., Sept. 24, 1898.

⁵ Arch. of Pediat., Aug., 1897.

⁶ Wien. med. Woch., Sept., 1897.

disposition may be transmitted from parent to child through more than one generation.] In illustration of the hereditary origin of this disease, H. Harlan¹ records a case which completes the transmission through 6 generations. [Perhaps such a history would be less unusual were it not for the difficulties that surround the surgeon in his efforts to obtain authentic knowledge of the antecedents of his patients. Traumatism, resulting in closure of the filtration-angle of the anterior chamber, either by dislocation or swelling of the lens, is not an uncommon cause of glaucoma, and, in view of our understanding of the pathology of the affection, is sufficient ground for development.] In the case of de Schweinitz² the glaucoma followed traumatism and probably lateral dislocation of the lens, and its onset was preceded by optic neuritis and softening of the structure of the nerve by inflammatory exudate. From these and similar instances, such as S. C. Ayres's³ case of glaucoma following cataract-extraction, we learn the necessity of keeping such patients under observation for some time.

Diagnosis.—To the list of diseases which may by the inexperienced be confounded with glaucoma is added ophthalmic migraine by Parasotti.⁴ His case showed many of the signs of glaucoma—acute pain, cloudy cornea, lowered vision, and pulsation of the retinal artery—yet it was considered by him to be migraine, and he interpreted the signs as those of excessive disturbance of nerve-function.

Mydriatics.—E. Jackson⁵ gives expression to the general belief concerning the use of mydriatics, both in establishing the diagnosis and as a means of treatment in this disorder. He does not agree with those who declare mydriatics must not be used. On the contrary, he considers their application justifiable in some cases. For example, in the simple, noninflammatory form, when differentiation from optic atrophy is uncertain and the consent of the patient has been obtained, he does not hesitate to dilate the pupil, both to examine the state of the papilla and to learn the effect of the mydriatic upon the tension. As a rule, however, such drugs are dangerous in eyes verging upon glaucoma, although exceptionally they are harmless even in such eyes. In the presence of posterior synechiae, atropin, and not eserin, may give relief. If myotics relieve pain and reduce tension they should be preferred to operation. [The therapy of the noninflammatory form is unsatisfactory. Vision slowly declines and the visual field gradually contracts even under the constant use of eserin; iridectomy—the sovereign remedy in the inflammatory forms—is equally ineffective in checking the progress of the disease.]

Treatment.—Abadie⁶ finds the combination of eserin and pilocarpin the best myotic, and prefers it to either remedy alone. His formula is: Eserin sulph., 0.05 gm.; pilocarpin chlorohyd., .05 gm.; distilled water, 20 gms. [The advantage of adding pilocarpin does not seem clear. The objects to be gained are contraction of the pupil and withdrawal of the iris-tissue from the filtration-angle, and we have found that in such cases, when any drug can be absorbed, eserin alone accomplishes the end.] Lavagna⁷ has used the bromohydrate of arecolin, 1 : 100, with satisfaction whenever excess of tension was present. He claims that myosis is produced in 10 minutes, and continues *ad maximum* 28 to 30 minutes. [If this claim is true, we have a valuable addition to the known myotics.]

Operation.—The newest procedure for the operative cure of glaucoma is

¹ Jour. Am. Med. Assoc., Oct. 8, 1898.

² Arch. of Ophth., xxvii., Apr., 1898.

³ Am. Jour. Med. Sci., Apr., 1898.

⁴ Ibid., Jan. 1, 1898.

⁵ Ann. d'Oculist., May, 1898.

⁶ Rec. d'Ophtal., Jan., 1898.

⁷ Gaz. hebdom. de Méd. et de Chir., May 1, 1898.

bilateral exsection of the superior cervical ganglion of the sympathetic. Jonnesco¹ has operated a few times and claims remarkable results. One case was a man, 50 years of age, who had had glaucoma for 6 years and had been blind for 2 years. After operation tension fell to normal and vision improved to counting fingers at 6 feet. Panas² comments on this report by saying that Jonnesco's cases are too few and too recent to make it advisable to adopt sympathetomy as the treatment for acute, subacute, chronic, or simple glaucoma. N. J. Weill³ considers excision of a small piece of the cervical sympathetic nerve to be the proper mode of action. Cutting alone, he says, is not sufficient. [It is our opinion that operable cases are benefited most frequently and permanently by iridectomy, and we would exclude from this class the noninflammatory form. Panas is right in contending against the adoption of so serious an operation when the results claimed are based upon insufficient data.]

DISEASES OF THE RETINA.

A case of permanent **scotoma**, the result of looking at the sun without shading the eyes, is recorded by E. T. Collins.⁴ [That this condition is not as infrequent as is generally supposed is shown in Kenneth Scott's article on this subject, in the *Ophth. Rev.*, 4 or 5 years ago. The fact that gazing at the sun with unshaded eyes may induce a permanent blind spot in any individual ought to be more generally known among the profession at large.] In a 11-year-old child presenting rather sudden amblyopia and slight contraction of the form-field notwithstanding normal nerves and retinae, Gottschalk⁵ saw rapid recovery follow on detection and correction of purulent disease of the frontal sinuses. Packard⁶ reports another instance of amaurosis with central scotoma following an intranasal operation.

Pigmentary Diseases.—In 7 cases of retinitis pigmentosa, Schoen⁷ found well-marked rachitis in every one, and affirms his belief that the pathology of the retinal disorder will be found to be intimately bound up with that of rachitis. Antonelli⁸ has been studying the eye-lesions associated with and consequent to the pernicious fever of tropical climates—to wit, neuritis, retinochoroiditis, increasing night-blindness, shrinking of the visual fields, and grave loss of vision. The author was struck with the close resemblance of the changes to those seen in typical pigmentary retinitis. Apropos of these cases, H. Symonds⁹ reports 2 cases of night-blindness and contraction of the visual fields (notwithstanding full central vision) occurring in brothers who were the children of second cousins. There was little, if any, abnormality of the fundi and no patches characteristic of retinitis pigmentosa. Sauvino¹⁰ states that the congenital patches of atrophied, absorbed, or heaped-up pigment found frequently in the retina and choroid of young subjects are not characteristic of hereditary syphilis, but may be called simply "stigmata of degeneration"; on the other hand, traces of optic neuritis exist often in hereditary syphilis, and constitute signs of the first order in diagnosing it. E. Fuchs¹¹ points out the great clinical resemblance between retinitis pigmentosa, retinitis punctata albescentis, and gyrate atrophy of the choroid and retina, and is inclined to view them all as chronic degenerations of the retina preceded by primary disease of the choroid.

¹ Sem. méd., Oct. 20, 1897.

² Am. Jour. Ophth., Jan., 1898.

³ Woch. f. Therap. u. Hyg. d. Auges., Mar.

⁴ St. Louis M. and S. Jour., May, 1898.

⁵ Rec. d'Ophthal., May, 1898.

⁶ Rec. d'Ophthal., May, 1898.

⁷ Bull. d l'Acad. de Méd., May 24, 1898.

⁸ Royal Lond. Hosp. Rep., vol. xiv.

⁹ 10, 1898.

¹⁰ Centralbl. f. prakt. Augenh., Jan., 1898.

¹¹ Brit. Med. Jour., Jan. 22, 1898.

¹² Knapp's Archives, Sept., 1898.

Vicarious Retinitis.—Two distinct instances of neuroretinitis accompanying suppression of the menses are reported by Muzzy.¹ [The interesting question arises whether these are to be viewed as autointoxicative conditions.]

Albuminuric Retinitis.—The relation of albuminuric retinitis, and of retinal hemorrhages in particular, to the duration of life after their appearance is discussed by H. Derby,² who indicates their seriousness in warning of degeneration in the whole carotid system of blood-vessels, and shows how the danger-signal thus hung out may be utilized, not only in prolonging life, but also for the regulation of important business-interests. Absolutely identical views and just as urgent warning are expressed editorially in the *Jour. Am. Med. Assoc.*, Jan. 1, 1898. J. H. Eyre,³ in agreement with the foregoing arguments, reports 2 instances of albuminuric retinitis which at the time of examination showed no casts or albumin in the urine.

Retinal Hemorrhage.—König⁴ calls attention to our limited knowledge of the causes of vitreous hemorrhages, and states that in most cases they are due to rupture of the choroidal and retinal veins in subjects of arteriosclerosis, gout, syphilis, leukemia, malaria, cardiac hypertrophy, menstrual disorders, and diseases of the stomach. In this view he is supported by the claims of G. Manzutto.⁵ The association between gout and retinal hemorrhage is shown by Troussseau's cases,⁶ in which gout and excess of phosphoric acid in the urine seemed to be responsible for recurring hemorrhages into the retina and vitreous; while Galezowski's cases direct attention to the 2 factors, old syphilis and rheumatism, combining in the same individual to produce hemorrhages and inflammatory patches in the retina. He advises mercury and salicylates in the treatment. Abadie⁷ lays stress on 2 symptoms bearing on the causation of retinal hemorrhages in young subjects—namely, the epistaxis which precedes and accompanies them, and a noticeable diminution of red corpuscles in the blood. He recommends sulphuric lemonade and iron and quinin internally, and a leech to the temple to favor absorption.

Retinal Detachment.—Schmidt-Rimpler⁸ is opposed to the theory that detachment of the retina is usually due to traction exercised by fibrillæ resulting from inflammation in the vitreous; while C. Horstmann⁹ adheres to his belief that the retina is detached by exudation from the choroid. He also reposes the utmost confidence in Samelsohn's proposition to treat detached retina by rest in bed, diaphoretics, and bandage-treatment for 3 or 4 weeks; and deprecates all operative methods. A. Bourgeois¹⁰ gives an account of 10 cases of retinal detachment treated according to a method suggested by himself, which is based upon the work of Hache¹¹ (who labored to find the best substitute for, and the fluid that would best amalgamate with, the vitreous). Bourgeois injects not only under the conjunctiva, but also under the capsule of Tenon, from 6 to 10 drops of a solution containing neutral glycerin, 10 gr.; sodium chlorid, 3 gr.; and mercuric chlorid, 1 gr., which is to be repeated, as often as the condition of the eye will permit, for a period of several months. Of the author's 10 cases, the detachment was caused by traumatism in 3 cases, by myopia in 2, by general conditions in 2, and in the remaining 3 by unexplainable causes. As to results, he obtained no improvement in 1, a moderate improvement in 1, a notable improvement in 7, and a cure in 1. J. O. Stillson¹²

¹ N. Y. Med. Jour., Jan. 15, 1898.

² Ophth. Rev., Sept., 1897.

³ Beiträge z. Augenh., Sept. 24, 1898.

⁴ Jour. Am. Med. Assoc., Jan., 1897.

⁵ Arch. of Ophth., Sept., 1898.

⁶ Compt. rend. de l'Acad. de Sci., 1897; Rec. d'Ophthal., p. 385, 1889.

⁷ Am. Jour. Ophth., May, 1898.

⁸ Boston M. and S. Jour., July 22, 1897.

⁹ Rec. d'Ophthal., June, 1898.

¹⁰ Wien. med. Woch., July 10, 1897.

¹¹ Deutsch. med. Woch., No. 44, 1898.

¹² Rec. d'Ophthal.

prefers gradual evacuation of the subretinal fluid in detachment of the retina, accomplishing this by multiple puncture of the sclera with a fine galvanocautery-point. He reports 5 cases treated by this method, with 4 recoveries. [If these 4 cases remain cured at the end of 5 years it will be a most astonishing percentage of recoveries, for the prognosis of retinal detachment under any treatment is not hopeful.]

Glioma.—In 24,500 cases in private practice, J. L. Thompson¹ has seen 13 instances of glioma of the retina. In 7 cases in which enucleation was not performed the patients died within 1 year of the time of examination. Three cases are reported as cured, although the author does not state whether the remaining $\frac{1}{4}$ were operated or not.

DISEASES OF THE OPTIC NERVE.

Retrobulbar Neuritis.—What W. A. Holden² has finally shown has long been suspected by pathologists—namely, that the first pathologic changes in experimental **quinin-amblyopia** are the breaking down of the ganglionic cell-bodies and a deposition of myelin-like substance in the nerve-fibers. From the third to the seventeenth day nerve-cells were destroyed and a breaking-down of the medullary sheaths of the fibers of the optic nerve was noticed. By the forty-second day both the cells and the nerve-fiber layer had disappeared and degeneration could be traced up to the external geniculate body of the pulvinar. No other signs of degeneration could be found in the brain or cord. De Schweinitz³ believes, with Holden, in Nuel's theory, that tobacco and other toxic amblyopias are not, primarily, affections of the optic nerve, but an ascending degeneration due to destruction of the ganglion-cells of the macula. H. T. Mitchell⁴ suggests that in quinin-amblyopia "the arterioles are narrowed, not because of spasm of the muscular coat, but owing to the formation of rigid connective tissue in the space between the tunica intima and the middle tunic. When the intima becomes quite organized the functions of the middle tunic are lost, and the vessel remains permanently smaller." [The amounts of quinin borne and the lapse of time necessary before the poisonous effect on vision is apparent vary greatly in different individuals.] For instance: a child of 3 years ingested 30 gr. within 18 hours (H. D. Bruns⁵); a child 7 years old, 106 gr. in 3 days (S. C. Ayres⁶); an adult, 100 gr. within an hour or two (H. Harlan⁷); and another adult, 60 gr. at one time (J. M. Ball⁸). All recovered full acuity of vision, but the disks remained white and the arteries were permanently contracted. An unusual cause of central amblyopia is mentioned by C. A. Veasey⁹—namely, the inhalation and cutaneous absorption of anilin-dyes. The patient recovered vision after the administration of strychnin and the use of a respirator while at work. L. J. Lautenbach¹⁰ does not agree with the writers above quoted as to the pathology of toxic amblyopia [but his observations are purely clinical and are not confirmed by microscopic sections]. He thinks the poison primarily expends its force on a cerebral inhibiting center governing the axial fibers of the nerves. This effect, he says, is not induced by absorption of the alkaloid, but of the soluble products of combustion; hence, is not found in snuff-takers or in tobacco-chewers. Indeed, while he does not recommend chewing as an aid to the treatment, he does not

¹ Jour. Am. Med. Assoc., Sept. 17, 1898.

² Am. Jour. Med. Sci., Sept., 1897.

³ Ophth. Rec., Mar., 1897.

⁴ Am. Jour. Ophth., xv., 1898.

⁵ Tr. Am. Ophth. Soc., 1898.

⁶ N. Y. Med. Jour., July 2, 1897.

⁷ Ibid.

⁸ Ibid.

¹⁰ Ophth. Rec., Aug., 1898.

prohibit it when the habit is very strong. J. Widmark¹ made a postmortem examination in a case of tobacco-amblyopia which confirms in all essentials the findings in 16 cases previously reported, and does not in any way change our ideas as to the location of the papillomacular bundle of fibers in the optic nerve and tract.

Optic Neuritis.—Risien Russell² cautions against placing too much reliance upon optic neuritis in the diagnosis of brain-tumor, since it is present in anemia, hyperopia, lead-poisoning, albuminuria, etc.; although he admits it is, in its higher degrees, strong presumptive evidence. E. v. Grosz³ has had the opportunity in 5 additional cases to prove his claim, previously made, that choked disk is the accompaniment of brain-tumor; while optic neuritis or papillitis, when occurring with some intracranial disease, generally denotes an inflammatory condition, such as gumma or tubercle. [Choked disk differs from optic neuritis only in degree, and until an arbitrary line marking the ending of the inflammation and the commencing of the choking is drawn, the diagnosis of the character of the lesion must be a matter of personal equation.] [Equally debatable is the statement of] J. M. Martin,⁴ that optic neuritis has a localizing value. He says it is present in 39% of tumors of the cerebellum and parietooccipital region. "There are quite sufficient data to justify one in stating absolutely that the seat of the lesion is probably on the side on which the optic neuritis is more marked, in the proportion of 71 to 29." [It must be remembered that optic neuritis is more frequently an indirect or remote symptom of intracranial tumor than the result of contact or even transmitted pressure upon the optic nerve.] E. Krueckmann, in a lengthy communication based upon one case,⁵ commits himself to the "inflammation" theory of choked disk. However, in his case the tumor was one of the optic nerve, just back of the ball [and the conclusions drawn do not bear as closely on the subject of the genesis of choked disk as if it had been a true brain-tumor.]

Optic Atrophy.—W. C. Posey's⁶ 3 cases of hereditary optic atrophy demonstrate the progressiveness of the affection and the uselessness of attempting favorably to modify its course by strychnin and the iodids. Atrophy from congenital syphilis possesses certain ophthalmoscopic characteristics, according to Antonelli.⁷ The gray or white papilla is surrounded by a ring of atrophied choroid, and little piles of pigment irregularly scattered in this ring; the caliber of the arteries is diminished while that of the veins is enlarged, and the retina is here and there suffused. [These were probably isolated patches of inflammation in which later the choroid and the pigment of the retina became absorbed. The classification of acquired atrophy into cortical, from alteration in the centers of vision, and glaucomatous, from alteration in the nutritive fluid distributed in the course of the nerve, is too general to be of much service to the clinician. For instance, one would be uncertain how to classify the atrophy of tabes and other spinal diseases.] Tabetic atrophy is frequent, and as one of the earliest symptoms of spinal mischief (as repeatedly claimed by E. v. Grosz⁸ and others) it is important that it should be well studied. Grosz says the degeneration attacks first the peripheral fasciculi in the nerve and soon becomes an ascending degeneration.

Treatment.—E. v. Grosz⁹ says he has had good results in some cases following the administration of large doses of quinin salicylate. In "idio-

¹ Mittheil. a. d. Augen. d. Carolin. med.-chir. Inst., Stockholm, 1898.

² Treatment, Sept. 9, 1897.

⁴ Lancet, July 10, 1897.

⁶ Ann. of Ophth., July, 1898.

⁸ Centralbl. f. prakt. Augenh., May, 1898.

³ Centralbl. f. prakt. Augenh., May, 1898.

⁵ Graefe's Archives, vol. xlv., No. 3.

⁷ Rec. d'Ophtal., June, 1897.

⁹ Ibid.

pathic" atrophy W. F. Coleman¹ has been able to improve vision and the vascularity of the nerve by the daily application of faradism, 5 ma. for 5 minutes; and Gottschalk² states that the intermittent use of moist or dry heat over the eye not only brings about slow improvement in vision, but also restores some of the lost color-sense in those whose vision is $\frac{3}{60}$ or better.

INJURIES TO THE GLOBE, AND OPERATIONS.

Asepsis and Antisepsis.—From a study of the bacteriology of the normal conjunctival sac, J. Eyre³ concludes that it frequently contains microorganisms extremely varied in character, which may or may not be pathogenic; and that the conjunctival sac of any given individual may be sterile at the particular moment an observation is made. When considered as divisible into an upper and a lower fornix, the former is much oftener sterile than the latter. Sterility of the sac is due to the mechanical flushing of its mucous surface by the lacrimal secretion, and perhaps to the bactericidal action of that fluid. As the majority of corneal incisions are made in the upper half of the cornea, and are consequently subjected to this flushing during the whole healing-process, it is clear that, unless some debilitating cause obtains, no bacteria could gain much of a foothold in the conjunctival sac for any length of time. In this same connection, E. Clarke⁴ found experimentally that in clean incised wounds (4–6 mm. in length) the anterior chamber may be reestablished in 30 minutes. He emphasizes the importance of a few hours' absolute rest after eye-operations. Wounds of the upper corneal margin heal quicker and with less scarring than those in the center or lower margin. [This is directly in line with the findings of Eyre as to the sterility of the upper fornix.] Lawson,⁵ inquiring experimentally into the bacteriologic status of 200 normal conjunctivæ, was struck by the following facts: 1. The frequency with which the so-called xerosis-bacillus was found. 2. The comparative infrequency and attenuated form of the pyogenic cocci. 3. The considerable number of sterile tubes. The author agrees with Eyre that the reason the xerosis-bacillus has been overlooked in bacteriologic studies of the conjunctiva is the difficulty of growing the bacillus on any other medium than blood-serum. If this medium is employed, it will be found that the xerosis-bacillus is not only the most frequent bacterium met with in the conjunctiva, but it may also be said that it is a common resident of the sac. [If these facts are further substantiated, we have now two almost constant residents of the conjunctival sac—the xerosis-bacillus, according to Lawson and Eyre, and the *Staphylococcus epidermis albus* (of Welch), according to R. L. Randolph.] Lawson goes on to say that if the xerosis-bacillus be excepted, the conjunctival sac is singularly devoid of living microorganisms. All of the foregoing facts point strongly to the conclusion that the conjunctival sac, probably chiefly by its epithelium, but also possibly in part by the lacrimal secretion, possesses great powers of resistance to the growth and life of pathogenic pyogenic organisms, a statement supported by the great immunity of eye-wounds from suppuration even before the days of aseptic surgery. He therefore urges abandoning all irritant antiseptic solutions, remarking, in conclusion, that there is a greater proportion of infected sacs in old than in young persons, possibly because of the defective drainage so frequent in old people. In discussing the foregoing paper, McGillivray⁶ said he had given up all antisepsis in oph-

¹ Am. Jour. Ophth., July, 1898.

² Ann. of Ophth., Oct., 1897.

³ Brit. Med. Jour., Aug. 20, 1898.

⁴ Woch. f. Therap. u. Hyg. d. Auges, Oct. 21, 1897.

⁵ Lancet, Oct. 30, 1897.

⁶ Ibid.

thalmic surgery, using now only sterile normal salt solution. He believed that after the sixtieth year nearly all conjunctivæ are septic. These are the views also of H. Dalin¹ and Noyes,² both of whom prefer a 2% solution of boric acid, and of McGillivray³ and Mackinlay,⁴ who urge asepsis as being more nearly in line with nature's way of healing. Bonner,⁵ on the other hand, considers conjunctival asepsis impossible, and hence uses antiseptics; Bickerton⁶ and L. Bach⁷ rely on 1:5000 bichlorid solution; B. E. Fryer⁸ on a 2% solution of protargol; and Wherry⁹ on powdered ariol dusted into the eyes, particularly in postoperative infections. In a discussion of this subject before the Section on Ophthalmology of the British Medical Association¹⁰ attention was drawn almost without exception to the importance of excluding disease of the lacrimal passages, and also to thorough cleansing of the eyelashes by rather forcible scrubbing. Given a case of lacrimal disease, there seemed to be considerable diversity of opinion as to what would be best to do. In regard to the preparation of instruments, most of the speakers depended upon boiling-water more than anything else, although some objected that boiling dulled the edge of cataract-knives. Dressings could be sterilized by heat. As to the preparation of the conjunctival sac just before operation, the drift of opinion was in the direction of nonchemical asepsis, rather than reliance upon the usual germicidal solutions. The two most prominent points in the remarks made were the necessity of cleansing the eye and its adnexæ thoroughly and of scrupulous cleanliness of one's instruments.

Lids.—For correction of ectropion, particularly of the senile variety, Theobald¹¹ recommends making a scar, 3 to 4 mm. wide, all along the length of the lid, and about 2 mm. from the ciliary border, with caustic potash.

Orbit.—Rothenspieler¹² insists that the eyeball, the capsule of Tenon, and their enveloping cushion of connective tissue are really nothing but a ball-and-socket joint; that the terms exophthalmos and enophthalmos describe a symptom only, and should therefore give way to the term "luxation of the bulb." [This article is a masterly study of the whole subject of anomalies of the position of the globe in the orbit.] Traumatic exophthalmos is viewed by E. Franke¹³ as the consequence of fracture of the orbit sufficient to permit some of the orbital tissues to escape into some one of the neighboring sinuses. F. Schanz¹⁴ reports the case of a 25-year-old glassblower who produced protrusion of the globes quite outside of the lids by blowing his nose very hard. The author doubted the patient's statement, whereupon the latter again produced the condition before the author's eyes. The unusual tolerance sometimes shown to foreign bodies is illustrated in the case of Prince Carl Theodor,¹⁵ in which a piece of a caseknife-blade, 2 in. long, was removed from below the inferior orbital wall of a grown man who had been stabbed through the lower lid 12 years before. The knife-blade had broken off, and was so embedded in the inferior orbital tissues and the superior maxillary bone that it had given rise to no special symptoms. For the usual treatment of purulent disease of the frontal and accessory sinuses, S. S. Golovine¹⁶ suggests thorough antiseptics of the sinuses by means of steam and the desiccation of the mucous membrane. The sinuses later fill up with the osseous material exuded by the changed periosteum. His method is to open the sinus near the inner angle of the orbit,

¹ Nord. med. Ark., Aug., 1897.

² Brit. Med. Jour., Mar. 19, 1898.

³ Arch. of Ophth., Oct., 1897.

⁴ Brit. Med. Jour., Jan. 15, 1898.

⁵ Tr. Am. Ophth. Soc., 1898.

⁶ Klin. Monats. f. Augenh., Aug., 1898.

⁷ Klin. Monats. f. Augenh., Apr., 1898.

⁸ Med. Rec., Oct., 1897.

⁹ Ibid.

¹⁰ Tr. Am. Ophth. Soc., 1898.

¹¹ Ibid., Jan. 8, 1898.

¹² Beiträge z. Augenh., xxxi., Apr., 1898.

¹³ Beiträge z. Augenh., Sept. 24, 1898.

¹⁴ Arch. of Ophth., May, 1898.

¹⁵ Ibid.

evacuate the pus, and introduce steam one-quarter to one-half minute, to be repeated a number of times in 10 minutes. Recovery is slow; but the advantages of the method are that the sinuses become occluded, thus setting aside all probability of relapses, and there is practically no deformity following the operation. [Vanzant, of Philadelphia, has recently reported several instances of striking relief from frontal headaches following the use of a spray of steam or hot air projected into the frontal and accessory sinuses. It would seem much more rational to attack these conditions through the nose and establish natural

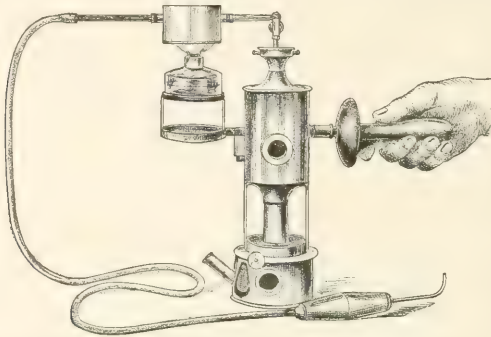


FIG. 81.—Steam-producing apparatus to destroy the mucous membrane of the frontal sinus (S. S. Golovine, in *Arch. of Ophth.*).

drainage than to enter the orbit, unless a counteropening is indicated.] Sudden blindness from a bullet-wound of the orbit was found by A. Alt¹ to be due to an extensive hemorrhage into the orbit compressing the optic nerve; and also to rupture of the choroid and retina from contrecoup.

Glaucoma.—In cases of incarcerated iris with high tension, J. B. Lawford² passes a Graefe knife through the margin of the cornea and the anterior chamber, emerging at the opposite corneal margin. Both punctures are then enlarged and an iridectomy done through each one—*i. e.*, a double iridectomy. This procedure was thought unnecessary by Argyll-Robertson,³ Williams,⁴ Snellen,⁵ Collins,⁶ and Little;⁷ Berry⁸ sometimes performs double iridectomy for such a purpose, but always with a keratome. Valude and Duclos⁹ claim that division of the ciliary muscle, as performed with Valude's needle-knife, is extremely useful in the prodromal stage of glaucoma and in certain forms of chronic glaucoma.

Penetrating Wounds.—Spontaneous extrusion of a piece of guncap that had entered the anterior chamber a few days previously is reported by J. P. Worrell.¹⁰ Hirschberg's¹¹ second series of 34 consecutive cases of steel splinters in the eye, with 33 recoveries, indicates pretty plainly that in properly selected cases and with the correct technic the magnet-operation, as practised to-day, is a comparatively safe operation.

X-ray Methods.—A. G. Thomson¹² reiterates the great advantage of using X-rays for the diagnosis of foreign bodies in the eye, and of Sweet's

¹ *Am. Jour. Ophth.*, Jan., 1898.

² *Ibid.*

³ *Ibid.*

⁴ *Ibid.*

⁵ *Brit. Med. Jour.*, Aug. 20, 1898.

⁶ *Ibid.*

⁷ *Ibid.*

⁸ *Ibid.*

⁹ *Arch. d'Ophth.*, Apr., 1898.

¹⁰ *Centraltbl. f. prakt. Augenh.*, Feb., 1898.

¹¹ *Tr. Am. Ophth. Soc.*, 1898.

¹² *Am. X-ray Jour.*, June, 1898.

method of localizing them. French surgeons also admit that foreign bodies in the eye can be successfully detected by means of the X-rays, as shown in the report of Wuillomenet.¹ In Germany, Stockl² reports 2 cases of penetrating bodies located by the X-rays when other methods failed to find them. At the meeting of the British Medical Association, Davidson³ described the method which he used in 41 cases. It is based on finding the coordinates of any two points. In his apparatus a vertical knitting-needle forms one plane, a horizontal needle the second plane, and the photographic plate the third. The patient's gaze must be parallel to the horizontal needle, and to the lower eyelid must be fixed a loop of lead wire with its point projecting upward, forming the landmark from which the position of the foreign body is to be calculated. The Crookes tube is on a sliding scale, and the second exposure is made from a point 6 cm. forward of the position used for the first. Exposure for 1 minute is sufficient from a tube with a small plate, from which the light is emitted. The situation of the foreign body is then calculated from the proofs by means of a second apparatus, which is not described, but which, it seems (from the discussion which followed), is a schematic eye. E. Treacher Collins,⁴ using the above method, was successful in removing foreign bodies from 4 eyes. The period between accident and operation was 4 months, 5 days, 15 years, and 4 weeks, respectively. In the discussion of Davidson's⁵ paper, Cargill, McHardy, and Nettleship all reported successful localization of foreign bodies with Davidson's method. De Schweinitz⁶ reports a successful localization of a piece of steel by Sweet's method. It was later extracted from the vitreous with the magnet. W. M. Sweet⁷ has successfully localized quite a large number of foreign bodies with his method.⁸ The simplicity and accuracy of his apparatus and method are making many friends for it, if the reports in the literature are any criteria [and we think they are]. Reeve⁹ prefers Sweet's apparatus and method, which he has used with great satisfaction in 3 cases; while Thompson's¹⁰ experience with the X-rays has been negative.

Enucleation and Evisceration.—Würdeman¹¹ gives as classic indications for enucleation: 1, malignant growths; 2, threatening sympathetic ophthalmitis; 3, pain, such as is caused by absolute glaucoma; 4, for cosmetic purposes; 5, panophthalmitis where Mules's operation is not permissible; and 6, cases having 2 or more of the above indications. H. I. Morton¹² insists that the old and common method of enucleation is neither justifiable nor scientific. He operates by making a deep incision from canthus to canthus, extending slightly upward above the level of the canthi, and into this space inserts a Thiersch skin-graft, suturing its anterior border to the edge of the lids. The largest eye that can be worn is then inserted. To prevent retraction of the orbital tissues, J. L. Borsch¹³ suggests insertion of a hollow piece of silver moulded to fit the orbit. [This has the same objection as Belt's suggestion of sponge for the same purpose, in *Med. News* of June 27, 1896.] Verrey¹⁴ and Dunlavy¹⁵ are both favorable to evisceration; and Brudenell Carter,¹⁶ after an experience with 150 cases, says that the risk of sympathetic disease after Mules's operation is purely imaginary, or at least that it has no better foundation than the occurrence of a certain number of coincidences. Hern,¹⁷ Buller,¹⁸ McGillivray,¹⁹

¹ Rec. d'Ophthal., May, 1898.² Brit. Med. Jour., Aug. 20, 1898.³ Ophth. Rec., July, 1898.⁴ YEAR-BOOK for 1898.⁵ Ibid.⁶ Ophth. Rec., July, 1898.⁷ Ibid.⁸ Lancet, July 31, 1897.⁹ Ibid.¹⁰ Wien. klin. Woch., Feb., 1898.¹¹ Ibid.¹² Arch. of Ophth., July, 1898.¹³ Brit. Med. Jour., Aug. 20, 1898.¹⁴ Ann. of Ophth., Oct., 1897.¹⁵ Ann. d'Oculist., May, 1898.¹⁶ Jour. Am. Med. Assoc., Jan. 1, 1898.¹⁷ Brit. Med. Jour., Aug. 20, 1898.¹⁸ Ibid.

and Bryant¹ all declare their satisfaction with Mules's operation; while S. Meighan,² Snellen,³ and Argyll-Robertson⁴ rather lean toward enucleation as the safest procedure. To promote filling in of the cavity with new tissue, S. D. Risley⁵ introduces a piece of sterilized sponge large enough loosely to fill the cavity [this is Belt's idea; see YEAR-BOOK for 1897] and sutures the conjunctiva over it. After recovery the appearance is much the same as that presented after the use of the glass ball. D. C. Bryant⁶ uses an aluminium ball with solid front and fenestrated side and back. The interior becomes filled with new tissue in a short while. Finally, J. W. Barrett,⁷ after freeing the globe from conjunctiva and Tenon's capsule, gathers the external and inferior rectus in one suture, and the superior and internal rectus in another suture, and after excising the globe introduces the glass ball, over which he sutures the tendons of the muscles with strong silk. Of 4 attempts 3 were successful.

Postoperative Meningitis.—Marshall⁸ records 5 cases of fatal meningitis, following removal of the eye, with microscopic findings.

Anesthetics.—Bronner⁹ finds that for nearly all the major and minor operations on the eye, cocain in crystals is far preferable to the ordinary solutions. As the crystals cause smarting, he uses a few drops of a 20% solution first, and then lays about $\frac{1}{2}$ gr. of crystallized cocain on the part of the globe to be incised. After a few seconds of such contact the eyes are closed 4 or 5 minutes, and are then ready for operation. [If 20% solution of cocain in itself is not sufficiently anesthetic for all purposes, there is something the matter with the author's solutions. Moreover, it would be interesting to know how the corneal epithelium fares under the use of crystals of cocain.] R. L. Randolph¹⁰ shows quite a preference for **holocain** in eye-operations, because of the absence of effect on the corneal epithelium and on the pupil, and because of its germicidal properties.

AFFECTIONS OF THE ORBIT.

[The affections of the walls and contents of the orbit that have received most frequent notice in the journals and are of interest both to the rhinologist and ophthalmologist are tumors, benign and malignant, commencing in the sinuses and invading the orbit, and cellulitis arising spontaneously or as a complication of sinus-disease. The prominent ocular symptoms are exophthalmos, immobility of the ball, diplopia, and, later, blindness from necrosis of the cornea or atrophy of the optic nerve. Difference of opinion is expressed as to the advisability of surgical interference in cases of advanced malignant tumors. It is claimed by some writers that operation hastens death by inviting more rapid growth and extension of the seeds of the disease; and by others it is argued that life is prolonged and made more comfortable by early excision.]

Tumors.—In a patient of J. E. Jennings,¹¹ death resulted, 5 months after excision of a slowly growing orbital carcinoma, from rapid proliferation and invasion of the other orbit and of the cerebral cavity. Fibrosarcoma, a less malignant form of tumor, may attain enormous size and yet be safely removed. In the case cited by F. M. Wilson¹² the eye was pushed forward $1\frac{1}{4}$ in. The tumor was excised and the ball retained, with preservation of the

¹ Ophth. Rec., Aug., 1898.

³ Ibid.

⁶ Ophth. Rec., Aug., 1898.

⁸ Royal Lond. Hosp. Rep., vol. xiv.

¹⁰ Bull. Johns Hopkins Hosp., July, 1898.

² Brit. Med. Jour., Aug. 20, 1898.

⁵ Tr. Am. Ophth. Soc., 1898.

⁷ Intercol. Med. Jour. Austral., May 2, 1898.

⁹ Brit. Med. Jour., Aug. 20, 1898.

¹¹ Am. Jour. Ophth., Jan., 1898.

¹² Tr. Am. Ophth. Soc., 1898.

motility of the iris and of some vision [a remarkable success, particularly in view of the opinion of some of his colleagues, who were adverse to operation]. The cause in some cases of sarcoma observed by C. S. Bull and Knapp¹ was unquestionably traumatism. [Notwithstanding the assertion that operations may hasten the growth of a tumor of the orbit, it is our opinion that surgical measures are, as a rule, the only available means of treatment of malignant neoplasms, and the earlier in the history of the case the better the prognosis. If there should be any doubt as to the malignancy of the tumor, it is just to the patient that he should have every advantage that medicinal therapeutics may offer.] Both M. Standish and G. E. de Schweinitz² have seen lymphomatous tumors disappear under the internal administration of arsenic. The close connection between diseases of the sinuses and orbital cavities is shown by a case of abscess of the orbit secondary to ethmoiditis, reported by G. E. de Schweinitz.³ Opening and thorough curetting brought about recovery after some delay. The same connection is illustrated by a tuberculous orbital tumor originating in the ethmoidal cells, described by Vieusse.⁴ He incised the growth and removed a viscid, caseous mass, and found the internal wall of the orbit almost entirely destroyed. C. F. Clark's case⁵ resembled osteoma of the orbit, but proved to be a large abscess, probably commencing in the frontal sinus and invading the brain-cavity and the orbit. The inner wall of the sinus and the roof of the orbit were destroyed. The patient improved rapidly after evacuation of the pus. The constitutional affections that have given rise to ethmoidal empyema and, as consequences, ocular and orbital complications, are, according to Vieusse,⁶ erysipelas, measles, scarlatina, variola, mumps, and pneumonia. An infectious agent is created in the nasal fossæ, which easily penetrates the ethmoid cells, rapidly multiplies, and acts as a source of irritation. Leplat⁷ saw orbital cellulitis after instrumental delivery in a 2-weeks-old child. There were 2 perforations in the conjunctiva and 1 in the inner orbital wall, through which pus was discharged into the nose. Iritis, as an ocular complication of nasal disease, has received scant notice in the literature. Fage⁸ has found in the conjunctival sac the coco-bacilli of Löwenberg, exactly identical with that found in the discharges from the mucous membrane of the nostrils in ozena. [Ozena may compromise the results of successful cataract-extraction, and its existence demands antiseptic nasal douches before and after operation; and yet, in spite of energetic treatment, iritis may develop.]

Hemorrhage.—Shaw⁹ reports a case of spontaneous hemorrhage into the orbit, causing protrusion of the globe of $\frac{1}{2}$ in. Single vision was maintained while looking directly forward; diplopia in all other directions.

Cysts.—A. H. Griffith¹⁰ removed from the left orbit of a 53-year-old woman a cyst measuring 21 by 15 mm., which he regarded as an offshoot from the capsule of Tenon or from the bursa around the tendon of the superior oblique muscle as it lies in the pulley. The cyst was neither hydatid nor cysticercal. The patient made a good recovery.

THERAPEUTICS AND NEW REMEDIES.

Protargol.—The treatment of the external diseases of the eye has undergone some changes during the past year, less marked in method than in remedy. Protargol, as a substitute for silver nitrate in the treatment of in-

¹ Tr. Am. Ophth. Soc., 1898.

² Ibid.

³ Medicine, Apr., 1898.

⁴ Rec. d'Ophtal., May, 1898.

⁵ Tr. Am. Ophth. Soc., 1898.

⁶ Rec. d'Ophtal., June, 1898.

⁷ Klin. Monats. f. Augenh., Apr., 1898.

⁸ Rec. d'Ophtal., June, 1898.

⁹ Ophth. Rec., Jan., 1898.

¹⁰ Brit. Med. Jour., Aug. 20, 1898.

inflammations of the conjunctiva, has many warm advocates. Its points of superiority are its painlessness and greater effectiveness. It is a more active bactericide, has greater penetrating power, and forms no precipitate with albumin. Among its supporters are Darier,¹ who uses it in 10% solution for the non-purulent forms and in 50% solution for the purulent, acute, catarrhal, and pseudomembranous forms;² E. Pergens;³ A. Alt;⁴ Deneffe, in 5% to 10% solution;⁵ F. E. Cheney;⁶ L. Puerst;⁷ and B. E. Fryer, in 2% solution.⁸ [It is recommended in acute conjunctivitis, including the purulent forms, blepharitis, dacryocystitis—in short, in those diseases for which we have hitherto used the nitrate.] Valude⁹ dissents from the favorable opinions expressed by the above authors and restricts his use of protargol to the treatment of the milder forms only of conjunctivitis.

Ichthyol.—For local application, ichthyol in 50% solution, to which may be added a little glycerin, is spoken of in the highest terms for the cure of acute and chronic conjunctivitis by Eberson;¹⁰ and for the cure of blepharitis by A. Peters and Darier,¹¹ applied directly to the mucous membrane as an ointment.

Ichthalbin.—Wolffberg¹² suggests this drug, a compound of ichthyol and albumin, as representing all the desirable properties of ichthyol, without its disagreeable odor. It was used by him *internally* in about 40 cases of glaucoma and iritis, in doses of 8 gr. thrice daily, and locally in keratitis and pannus. In all it had a decided analgesic action.

Antinosin and other New Drugs.—Among the remedies recently introduced for inflammations of the structures of the anterior portion of the eye are antinosin, recommended by W. J. Coleman;¹³ thiosinamin, gr. 1 to 3, administered internally or by hypodermic injection, to hasten absorption of opacities of the cornea, by G. F. Šuker;¹⁴ nosophen, by R. S. Patello;¹⁵ cassareep, a drug extracted from the juice of the black cassara, by S. D. Risley;¹⁶ "ethylindianinsilberphosphate," commonly known as "argentoinin," by J. S. Schulhoff;¹⁷ sanoform, by E. Jacobson,¹⁸ as a substitute for iodoform; xeroform, a bismuth-phenol combination, by Wieherkiewicz;¹⁹ airol, by G. Wherry,²⁰ especially efficacious in corneal ulcers and hypopyon; and itriol, by O. Mergel.²¹ As a myotic in glaucoma, J. Lavagnan²² has used with success arecolin hydrobromate, 1:100 solution. Among the better known remedies for conjunctival diseases formaldehyd continues to be used very generally, and is recommended by S. Morton²³ for its remarkable germicidal and diffusible powers in septic corneal ulcers; also hydrogen dioxid, in one-half strength, in blepharitis and as an antiseptic and hemostatic, by Vacher²⁴ and S. C. Ayres;²⁵ pieric acid, 5 or 10:1000, by Fage;²⁶ and tincture of iodine in ulcers and suppurative conditions of the cornea, trachoma, and pannus, by Baxter.²⁷

¹ Wien. klin. Rundschau, Feb. 6, 1898.

² Klin. Monats. f. Augenh., Apr., 1898.

³ Bull. d'l'Acad. roy. de Méd., vol. xii., No. 2, 1898.

⁴ Boston M. and S. Jour., Aug. 25, 1898.

⁵ Tr. Am. Ophth. Soc., 1898.

⁶ Klin. Therap. Woch., May 1, 1898.

⁷ Woch. f. Therap. u. Hyg. d. Auges, Jan. 27, 1898.

⁸ Jour. Am. Med. Assoc., Jan. 29, 1898.

⁹ N. Am. Pract., Dec., 1897.

¹⁰ Wien. med. Woch., Aug. 14, 1897.

¹¹ Woch. f. Therap. u. Hyg. d. Auges, Nov. 4, 1897.

¹² Brit. Med. Jour., Jan. 15, 1898.

¹³ Am. Medico-Surg. Bull., Dec. 10, 1898.

¹⁴ Rec. d'Ophthal., June, 1897.

¹⁵ Echo méd. du Nord, Jan. 2, 1898.

¹⁶ Rec. d'Ophthal., July, 1898.

¹⁷ Am. Jour. Ophth., Jan., 1898.

¹⁸ 1898.

¹⁹ Fortschr. d. Med., No. 4, 1898.

²⁰ Arch. d'Ophthal., July, 1898.

²¹ Am. Medico-Surg. Bull., Sept. 10, 1898.

²² 1898.

²³ Ophth. Rec., May, 1898.

²⁴ Tr. Am. Ophth. Soc., 1898.

²⁵ Ibid., May 5, 1897.

²⁶ Wien. med. Woch., Dec. 4, 1897.

²⁷ Rev. de Thérap. med.-chir., lxxix., 1898.

²⁸ Lancet-Clinic, Oct. 23, 1897.

²⁹ Boston M. and S. Jour., Oct. 21, 1897.

Heat and Cold.—W. H. Poole¹ discriminates to a nicety as to when dry and moist heat and cold should be applied in inflammations. [These fine distinctions are superfluous. In general, ice-cold applications are more soothing in conjunctival and lid-inflammations, and heat in diseases of the cornea and of the deeper tissues.]

Suprarenal Capsule.—After 4 years' use of the extract of suprarenal capsule in infusion, in more than 5000 cases, W. H. Bates² pronounces it an ideal hemostatic and astringent in all congestions and in operations on the eye and lacrimal duct. Ten gr. of the extract are macerated half an hour in 2 drams of water and then filtered, the filtrate representing a 1% solution of the extract.

Local Anesthetics.—Holocain has been received with decided favor. The claims that it is an efficient anesthetic and a powerful germicide are borne out by increased experience. Its merits are testified to by the following authors: R. L. Randolph and Hinschelwood;³ Berger;⁴ F. Lagrange and F. Cosse⁵ (the last-mentioned authors prefer cocain in the operations of cataract-extraction and iridectomy); Würdeman⁶ and Black;⁷ Zunz⁸ and H. Spiro;⁹ they all commend it in the highest terms and use it in preference to cocain for nearly all operations on the eye. On the other hand, F. C. Holtz¹⁰ finds it more painful and irritant to the conjunctiva than cocain, and less penetrating and consequently less numbing to the deeper structures. [Holocain solutions remain free from penicillium for many months. In operations on the muscles, when it is desirable that anesthesia shall be continued for some time and a tendency to hemorrhage exists, cocain is inferior to holocain.] In a comparison of eucain B and cocain of the same strength, P. Dolbeau¹¹ found that eucain is less toxic; however, it rather favors hemorrhage, its analgesic action is less complete, and its shorter duration in inflammatory conditions gives very imperfect anesthesia; it is more disagreeable to the patient, does not dilate the pupil, and does not seem to influence the intraocular tension. Both have the same action upon the cornea. The newest anesthetic is **aneson**, which in its commercial solution corresponds to a 2% or 2½% solution of cocain, but has none of the latter's local irritation and is nontoxic. Sternberg¹² strongly recommends it as a useful and safe anesthetic. The injection of 4 egm. of cocain solution into the lid of an emaciated and exhausted woman under the care of Germaix¹³ was followed by toxic symptoms. In other cases he has injected 15 egm. and 18 egm. without symptoms.

Mydriatics.—A. Pinner¹⁴ admits that the chemistry of the atropin alkaloids is by no means clear; but the following facts are established: that the plants *Atropa Belladonna*, *Hyoscyamus*, *Datura*, *Mandragora*, *Solanum*, and *Amsodus* contain 2 alkaloids—hyoscyamin, which is easily converted by alkalis into atropin, and hyoscin, which is identical with scopolamin. Meyer¹⁵ states that physiologically scopolamin and atroscin are practically identical; and E. Emmert¹⁶ also claims that hyoscin and scopolamin are not only chemically, but also therapeutically (at least as far as the eye is concerned) identical. Euphthalmin, in 5% to 10% solution, is said by Winselmann¹⁷ to be an ideal

¹ Jour. Am. Med. Assoc., May 14, 1898.

² Jour. Am. Med. Assoc., Sept. 24, 1897; Bull. Johns Hopkins Hosp., July, 1898.

³ Brit. Med. Jour., Sept. 3, 1898.

⁴ Rec. d'Ophthal., Nov., 1897.

⁵ Brit. Med. Jour., June 18, 1898.

⁶ Am. Jour. Med. Sci., Feb., 1898.

⁷ Klin. Therap. Woch., Sept., 25, 1898.

⁸ Centralbl. f. prakt. Augenh., Jan., 1898.

⁹ Centralbl. f. prakt. Augenh., Jan., 1898.

¹⁰ N. Y. Med. Rec., Oct. 8, 1898.

¹¹ Ann. d'Oculist., July, 1897.

¹² Am. Jour. Med. Sci., Feb., 1898.

¹³ Centralbl. f. prakt. Augenh., Aug., 1898.

¹⁴ Rec. d'Ophthal., Oct., 1897.

¹⁵ Rec. d'Ophthal., Apr., 1898.

¹⁶ Klin. Monats. f. Augenh., Jan., 1898.

¹⁷ Klin. Monats. f. Augenh., July, 1898.

mydriatic for diagnostic purposes, by reason of the quick pupillary dilatation (2 minutes), and because of the absence of effect upon the accommodation, the corneal epithelium, and the intraocular tension. Mydriasis disappears in about 7 hours. For precisely the same purpose—namely, pupillary dilatation without ciliary-muscle paralysis—Bourgon¹ considers ephedrin hydrochlorate, 5% solution, to be the best drug. [If these statements are correct, euphthalmin would seem also to be an ideal agent for retinoscopy.] Panas² proposes the oily instead of the aqueous solutions of the alkaloids, because when antiseptically prepared they will retain their power and remain aseptic for a long time. The oily solutions of cocain will not denude the cornea of its epithelium as does the aqueous.

Pilocarpin.—The hypodermic administration of pilocarpin muriate, 1 $\frac{1}{2}$ gr. daily, is recommended by Hansell³ for nonsyphilitic hyalitis and retinochoroiditis. Burnham⁴ goes a step further, and claims to have had surprisingly good results in syphilitic inflammations in cases in which mercury and the iodids had had little or no effect.

Subconjunctival Injections.—Zehender⁵ ascribes the benefit of this form of administering remedies to stimulation of the lymph-circulation, and recommends the physiologic salt solution in vitreous opacities, chronic affections of the uvea, and in retinal detachment. In purulent ophthalmia, particularly when the cornea is implicated or threatened, in trachoma, hypopyon, vitreous opacities, high myopia, optic atrophy, and retrobulbar neuritis, Sidlossy⁶ strongly recommends this method of treatment. On the other hand, J. E. Willets⁷ condemns it absolutely. [While not endorsing the wide application of subconjunctival injections, the method is rational and in certain cases is of undoubted benefit.]

Electricity.—[Electrolysis, both as a means of cure of chronic inflammations and as a means of diffusing therapeutic agents into the eye and facilitating absorption, has been tried with varying results.] Hansell⁸ believes, as a method of treatment of trachoma, it is useful only as an alternative. In Meibomian tumors it is applicable when removal by dissection is objected to. G. F. Keiper⁹ has had a more satisfactory experience in granular lids. He diffuses copper into the conjunctival tissue by cataphoresis by means of a blunt or sharp copper electrode attached to the positive pole, while the negative pole is held in the patient's hand. The current is 3 to 5 ma. in strength, and is continued for 5 minutes twice a week. Pansier¹⁰ recommends electrolysis as the best method of applying eserine in glaucoma and atropin in iritis. A. v. Reuss¹¹ reaffirms the claims for electrotherapy in scleritis, iritis, iridocyclitis, and vitreous opacities that he put forth last year.¹² A. Yerson¹³ agrees with him as to its efficacy in scleritis when used in conjunction with other treatment. A. v. Reuss¹⁴ further studies in galvanism and faradism show that the latter is preferable in most cases. [His results are striking and should lead to a thorough trial of his method.] Galvanism has given incontestably good results in purulent keratitis and iritis in the hands of Markoff.¹⁵ He places the anode against the closed lid and the cathode against any other part of the body, and, commencing with $\frac{1}{2}$ ma., slowly increases the current to 2 ma.

¹ Rec. d'Ophthal., Sept., 1898.

² Bull. d'Acad. de Méd. de Paris, May 24, 1898.

³ Phila. Polyclinic, vol. v., p. 469, 1897.

⁴ Canad. Pract., Apr., 1898.

⁵ Berlin. klin. Woch., Jan. 24, 1898.

⁶ Arch. d'Ophthal., July, 1898.

⁷ Ophth. Rec., Sept., 1898.

⁸ Phila. Polyclinic, June 25, 1898.

⁹ Ophth. Rec., Oct., 1898.

¹⁰ Arch. d'Elec. méd., June 15, 1897.

¹¹ Graefe's Archives, xlvii., pt. 2, Sept. 13, 1898.

¹² See YEAR-BOOK for 1898.

¹³ Rec. d'Ophthal., June, 1898.

¹⁴ Graefe's Archives, xlvii., Sept. 13, 1898.

¹⁵ Rec. d'Ophthal., Nov., 1897.

Intravenous Injections.—Jehin Prune¹ and de Speville² furnish strong evidence of the great value of intravenous injections of the cyanid of mercury in syphilitic diseases of the eye. They consider them superior to other forms of mercurial medication.

NEW INSTRUMENTS.

Autofundoscope.—G. M. Gould³ has devised an "autofundoscope," based on the long-known fact that by moving a pin-perforated card before the eye and observing an illuminated blank space through the perforation, faint movable images of the retinal vessels can be observed. His instrument adds much to the ease with which this phenomenon can be studied, and to the clearness and continuity of the image.

Ophthalmoscopes.—The same author⁴ offers a new ophthalmoscope designed to give the working oculist an instrument with double or treble the number of useful lenses in the ordinary ophthalmoscope, without the complicated and bothersome Rekoss-disk, without a handle, that does not need a case, and that is comparatively inexpensive. The lenses are arranged in 2 sets, independent of each other, each set in parallel continuous grooves or channels, similar to the Morton instrument in this one respect. The mirror, instead of tilting to either side, is reversible on its axis, and can thus be placed at any angle desired for use when patients are in bed or with the light from any direction. The mirror is readily taken out and inserted in either end of the instrument. Side-illumination is excluded by a tube containing the mirror and the body of the instrument, which is itself used as a handle. The arrangement of the lenses is, at the most used end, from 0.5 D. to 7.5 D. concave, and from 0.5 D. to 7 D. convex; and at the less used end, from 8 to 40 D. concave, and from 8 to 30 D. convex; thus supplying 60 lenses without the necessity of adjustment, an advantage that has never before been offered by any instrument. Neuscheuler⁵ adds to his ophthalmoscope a device carrying glasses of 3 different colors. After having studied clinically the effect on the eye-ground of glasses of different tints, he has limited their application to red, blue, and green. With these colored glasses in front of the ophthalmoscope he claims that fine shades in differences in color in diseased nerve-heads and retinas can be better appreciated than with ordinary illumination.

Ophthalmometer.—Satterlee⁶ does away with the large disk in his modification of the Javal-Schiötz ophthalmometer, and by the addition of several mechanical contrivances has added much to the simplicity and ease of use of this instrument. He claims for it better definition, and hence greater accuracy than the foreign one. His model can be easily taken apart and put in an ordinary grip. In the line of portable ophthalmometers, however, perhaps nothing equals that of Reid,⁷ which Hirschelwood⁸ has found of great convenience because it can be used anywhere, with the patient sitting or lying down, and only ordinary daylight is necessary to its satisfactory use.

Oblique Illumination.—For oblique illumination and ophthalmoscopic examination, Appenzeller⁹ employs acetylene gas as an illuminant, claiming for it neatness, safety, and ideal illumination. Examination of the eye by oblique light is also much facilitated by the joint use of Jackson's¹⁰ binocular magnifier.

¹ Ann. d' Ophthal., Oct., 1897.

² Jour. Am. Med. Assoc., Oct. 15, 1898.

³ Rec. d'Ophthal., Nov., 1897.

⁴ See YEAR-BOOK for 1897.

⁵ Centralbl. f. prakt. Augenh., May, 1898.

⁶ Rec. d'Ophthal., July, 1898.

⁷ Ibid.

⁸ Buffalo Med. Jour., May, 1898.

⁹ Ophth. Rev., Nov., 1897.

¹⁰ Jour. Am. Med. Assoc., Jan. 29, 1898.

Perimetry.—Stimulated by Wilbrand's researches with the "dunkel" perimeter in a dark room, C. Williams¹ has adapted our ordinary perimeter to the dark room by using as fixation-objects small electric lamps of 1 candle-power, in front of which are pieces of ground glass and a small metal diaphragm to limit the size and shape of the test-objects. With it his results have been more accurate than under the old method with daylight. Ascher's²



FIG. 82.—Ascher's perimeter (Ascher, in *Ophth. Klinik*).

perimeter is certainly unique. A hollow, transparent celluloid hemisphere, mounted at its rim on a handle, is marked on its convexity with the regular meridians, over which the surgeon passes the test-objects, and records the findings the same as with any ordinary perimeter. The whole contrivance weighs only 1 pound (?). For making a quick and approximately accurate test of the visual and color-fields, E. N. S. Ringneberg³ uses a triangular block of light wood mounted on a long, thin handle. The 3 faces of the block are 2 cm. square, and are colored red,

white, and blue. Any of the colors can be brought before the eye by a slight rotation of the rod between the fingers without altering the position of the hand. Galezowski⁴ calls his device a "planimeter." It is a complicated affair, and offers no marked advantages over the perimeters in daily use.

Thermometer.—The same author⁵ calls attention anew to the value of recording the local temperature in diseases of the eye. He offers for this purpose an ophthalmothermometer, the bulbar end of which is inserted in the conjunctival sac.

Squint.—W. v. Zehender⁶ submits an instrument for the exact measurement of deviations of the ocular axes. [It is rather complicated, and its use is of no practical interest.]

Surgical Instruments.—H. W. Wandless⁷ has designed a scissors for severing anterior and posterior synechiæ, and for dividing the capsule in secondary operations. It consists of a fine extremity, with cutting-edges, so placed that they will easily make their way through the cornea; and its shank is so constructed that it will retain the aqueous while the operation in the anterior chamber is being done.

Electromagnet Telephone.—E. C. Starr⁸ claims that a telephone adjustment to the electromagnet gives notice the moment the tip comes in contact with a foreign body in the eye. In his notes of a case he says "the eye was exposed to the X-rays, and the piece of steel could be seen with the fluoroscope freely moving about as the eyeball moved." This is a decided advance in X-ray methods. [The senior editor of this department has always failed to detect a foreign body in the ball by means of the fluoroscope.]

¹ *Ophth. Rec.*, Aug., 1898.

² *Buffalo Med. Jour.*, Feb., 1898.

³ *Ibid.*, Jan., 1898.

⁴ *N. Y. Med. Jour.*, Oct. 23, 1898.

⁵ *Ophth. Klinik*, No. 5, 1898.

⁶ *Rec. d'Ophthal.*, Sept., 1898.

⁷ *Klin. Monats. f. Augenh.*, May, 1898.

⁸ *Ophth. Rec.*, July, 1898.

OTOLOGY.

BY CHARLES H. BURNETT, M. D.,

OF PHILADELPHIA.

Epitome.—Limited space and the comparative unimportance of the past year's literature on diseases of the external ear have led to the omission of a consideration of these maladies, and to the beginning of our report with diseases of the middle ear. In the article which follows, an endeavor has been made to present succinctly the consensus of the opinion of aurists in Europe and America upon local medicinal treatment in chronic purulent otitis media, operations upon the auditory ossicles, and the ultimate results of operations upon the mastoid, all of which possess great interest and value to all practitioners of medicine. Of especial importance are the reviews of the contributions to our knowledge of extradural abscesses and suppurations of otitic origin, of the surgery of the lateral sinus and jugular vein, in sinus-thrombosis of otitic origin, and of the diagnosis and surgical treatment of otitic leptomeningitis.

DISEASES OF THE MIDDLE EAR.

Acute Otitis Media in Young Children and Infants.—Acute otitis media in children is often confounded with cerebral disease, and escapes proper treatment until irreparable injury is done to hearing and sometimes life is destroyed, as has often been stated. In alluding to this form of disease in very young children, Sir William B. Dalby¹ points out that in infants "the constitutional symptoms and the demeanor of the little patient, as indicating pain of an acute and agonizing character or pain prolonged over many days, are the sole evidences within our hands. The heightened temperature alone is not sufficient guide as to the necessity of paracentesis. In a large proportion of cases leeches and hot fomentations will cut short inflammations of the tympanic cavity; but it would be safe to adopt the rule that when they do not (for if they relieve, they do so at once), a vertical incision should be made in the posterior section of the membrane." The incision does no harm, even if no pus is found pent up in the ear-cavity, as is sometimes the case. Again, "in the infantile forms of this inflammation (not connected with the exanthemata) the process is often slow and subacute, the case dragging on day after day without the membrane giving way." A case of Sir S. Wilk's is quoted, in which spontaneous perforation was delayed 4 weeks, though Dalby has never observed the membrane to resist for more than 2 weeks. [These delays are very dangerous. We know a case in which spontaneous rupture of the membrana was awaited 1 week, during which period the pain was great and continuous. Spontaneous rupture then occurred; but the child, a girl of 6, ailed, drooped, grew feverish and comatose, and finally died of abscess in the cere-

¹ Brit. Med. Jour., July 24, 1897.

bellum.] Similar views are advanced by E. Ponfick¹ and J. H. Marsh.² Inflammation of the middle ear in nursing-infants, as shown by Hartmann,³ is an infectious disease due to acute coryza, bronchopneumonia, or vomited matter in the nasopharynx. The treatment of the otitis is the same as in adults; but it is rendered more difficult by the small and easily infiltrated auditory canal in infants. B. Gomperz⁴ shows that in infants, as the mouth of the Eustachian tube is low down near the palatine arch, crying readily forces septic matter from the pharynx into the middle ear, and thus sets up otitis media in influenza. The symptoms of meningitis are often caused by simple otitis media, rapidly disappearing as soon as pus escapes from the ear. Examination of the ear in infants is very difficult; but it ought to be made and paracentesis performed if there is retention of pus, in the presence of violent fever and other meningitic symptoms.

Middle Ear in Measles.—Further investigations by O. Rudolph and F. Bezold⁵ of the pathologic changes in the middle ear in measles seem to demonstrate that the middle ear is affected primarily like the skin in every case of measles. It is also shown that adenoid growths of the nasopharynx probably originate in disease of this cavity in measles. Similar views are advanced by A. O. Pfingst.⁶

Nose and Ear.—Pressure between the superior turbinated bone and septum and deviations of the septum cannot be considered causes of ear-disease so long as “the drain-portion of the nose is clear and unobstructed,” according to the experience of J. O. Tansley.⁷ [This is similar to our view and experience. We regret to say that often operation for correcting deviation of the septum of the nose has not only failed, but has, in addition, brought on acute ear-disease, followed by permanent impairment of hearing.] In a number of nasoaural cases, R. C. Myles⁸ has found Rosenmüller’s fossa “converted into a cavity, with 3 or 4 outlets, by adhesions which were apparently the remnants of old adenoid tissue.” These adhesions had united the vault of the rhinopharynx to the extremities of the Eustachian tube; they varied in length and width from 2 to 10 mm., and mucopus could generally be seen issuing from their sinus-pockets. The symptoms of stuffiness and fullness in the ears, with slight buzzing, and a deep dull pain over the ears, radiating into the temporal regions, and also symptoms usually attributed to passive hyperemia or congestion at the base of the brain, were relieved by cocaineizing (20% solutions) the diseased region described above, and breaking up with the index-finger the synechiæ about the mouth of the Eustachian tube.

Chronic hypertrophic nasopharyngeal disease is a prominent etiologic factor in the production of aural disease. **Atrophic nasal disease** has little to do with causing ear-disease, as shown by L. S. Somers⁹ in a statistical study of 600 cases of middle-ear disease. The **hereditary tendency** to this disease of the ear is pointed out afresh by the same writer.¹⁰ He recommends both pneumo- and phono-massage at first in the treatment of this malady: then, if these fail, some form of “removal of the ossicles in part or entirely.” [It is now quite well decided that removal of only the incus will do good in these cases. Removal of the entire membrane and the malleus, with

¹ Berlin. klin. Woch., Sept. 20, 1897.

² Brit. Med. Jour., July 24, 1897.

³ Proc. Internat. Med. Congress, Moscow, Aug., 1897.

⁴ Ann. des Mal. de l’Oreille, Mar., 1898.

⁵ Arch. of Otol., Oct., 1897.

⁶ Pediatrics, Feb. 1, 1898.

⁷ Tr. Am. Otol. Soc., 1897.

⁸ Ibid.

⁹ Univ. Med. Mag., Aug., 1897.

¹⁰ Medicine, Oct., 1897.

or without the other ossicles, is followed by inflammatory reaction and does no good to the hearing.]

Nerve-strain.—C. J. Blake¹ shows that the exercise of the ordinary communication with their fellow-men demands of deaf persons so much attention, all of which is normally accomplished without conscious effort, that the resultant fatigue in the deaf may be justly estimated as a possibly important factor in many cases of nervous overstrain.

Syphilitic Deafness.—Downie² reports a case of total deafness resulting from hereditary syphilis in a boy of 17. At the age of 11 the patient was suddenly attacked with great pain and tinnitus in both ears, followed rapidly by total deafness. Slight improvement under specific treatment. Finally a large gumma appeared over the *right* parietal tuberosity, followed by extensive necrosis and hernia cerebri. Repeated convulsions ensued, with permanent paralysis of the *left* arm and leg. Death occurred rather suddenly from failure of respiratory and swallowing-power, with perfect consciousness till the last. Postmortem examination revealed bony union between the stapes and oval window, sclerosis of the mastoid, and general hyperostosis throughout the various cavities of the labyrinth, all of which accounted for the deafness.

Pilocarpin.—Gorham Bacon³ has obtained the best results with pilocarpin in cases of sudden deafness due to syphilis. He has experienced disappointment with the remedy in cases of chronic catarrhal otitis media.

Operative Relief of Chronic Catarrhal Deafness.—Moure⁴ clings to total excision of membrana, malleus, and incus as a cure of chronic catarrhal deafness. In the discussion of his paper his position is attacked by Politzer and Cozzolino. [Total excision of the membrana tympani and ossicles, as a means of relief for chronic catarrhal deafness, is not supported by any aurist of authority in any country.] C. H. Burnett⁵ has found that removal of the incus is sufficient to liberate the impacted stapes in many cases of chronic catarrhal deafness, and to relieve tinnitus and ear-vertigo in all cases;⁶ and the hardness of hearing, if performed soon enough—*i. e.*, before the hearing sinks below a foot. Botey⁷ has found that puncture of the round window, while relieving tinnitus and vertigo, has failed to benefit the deafness in such cases.

Removal of the Stapes.—An article by R. Panse⁸ and the discussion it brought about reveal the fact that little good comes from removal of the stapes in chronic catarrh of the middle ear. In 12 cases in which he performed section of the incudostapedial joint and mobilization of the stapes, E. B. Gleason⁹ has found that tinnitus always disappeared after this operation. In 5 cases there was a "noticeable and practical improvement in the hearing."

CHRONIC PURULENT OTITIS MEDIA.

Sequelæ of Chronic Purulent Otitis Media.—Chronic purulency of the middle ear may cause the formation of a fistula passing from the septic drum-cavity forward along the zygomatic line to beneath the eye, where pus may escape, as in a case observed by R. Panse.¹⁰ After a mastoid operation,

¹ Boston M. and S. Jour., Aug. 19, 1897.

² Zeit. f. Ohrenh., Band xxx.; Arch. f. Ohrenh., Dec. 17, 1897.

³ Tr. Am. Otol. Soc., 1897.

⁴ Proc. Internat. Med. Congress, Moscow; Arch. of Otol., Feb., 1898.

⁵ Tr. Am. Otol. Soc., 1898.

⁶ Penna. Med. Jour., Feb., 1898.

⁷ Proc. Internat. Med. Congress, Moscow; Arch. of Otol., Feb., 1898.

⁸ Proc. German Otol. Soc.; Arch. f. Ohrenh., Nov., 1897.

⁹ Jour. Am. Med. Assoc., Mar. 5, 1898.

¹⁰ Proc. Austrian Otol. Soc., Nov. 30, 1897; Ann. des Mal. de l'Oreille, May, 1898.

Panse laid open the fistula from the ear to the cheek beneath the orbit, scraped a carious spot found in the bone on the front part of the zygoma, packed the tract with iodoform-gauze, and soon effected healing.

New Growths in the Ear.—Kümmel¹ points out the fact that nearly all forms of new growth, both benign and malignant, in the ear are preceded by aural suppuration. Granuloma, fibroma, keloids, angioma, chondroma, osteoma, lipoma, myxoma, papilloma, epithelioma, adenoma, cholesteatoma, endothelioma, carcinoma, and sarcoma are some of the forms of new growth found in the ear after chronic suppuration. H. de Fourgeray² and Vali³ show that primary epithelioma of the ear is usually due to previous chronic purulency of the middle ear. Cystoma may originate from a chronically inflamed mucous membrane of the middle ear, though they usually originate in the glandular tissues of the external ear, as shown by J. Gruber.⁴

Exfoliation of the Ossicles.—Liaras⁵ reports the expulsion of the incus and stapes as a result of otitis media in a phthisical subject.

Facial Paralysis.—F. Bezold⁶ reports 6 additional cases of labyrinth-necrosis and facial paralysis. The symptoms of this form of disease of the labyrinth are so well marked that the exfoliation of the sequestrum can be foretold quite accurately months before it occurs. The gradual failing of the hearing and the onset of vertigo, to which facial paralysis is added in a month or two, are indicative of the advance of demarcation and beginning exfoliation of the sequestrum. Other symptoms are the great and constant pains in the ear and head, which have persisted usually several months before the sequestrum is finally thrown off. Granulations, with tendency to rapid recurrence, are never wanting. The treatment consists in frequent antiseptic washing and removal of the granulations; and sometimes a mastoid operation is demanded, on account of the gravity of the aural and cerebral symptoms. Of 10 cases treated by Bezold, 8 recovered and 2 died.

Exfoliation of the Cochlea.—J. Gruber⁷ reports a case of exfoliation of the bony cochlea, the consequence of chronic purulent otorrhea, in a man of 30. F. Alt⁸ records a case of partial loss of the bony cochlea, in consequence of chronic purulent otitis media, in a child of 14. In both cases some hearing for the tuning-fork vibrating on the vertex was retained.

Tubercle of the Middle Ear.—Scheibe⁹ has observed and described 6 cases of mild tuberculosis of the middle ear characterized by extensive destruction of the drum-membrane and ossicles.

Tumor of the Brain.—Thomas Barr and J. H. Nicoll¹⁰ have observed a case of malignant tumor of the brain **originating in chronic suppuration of the middle ear**, with symptoms simulating those of a temporo-sphenoidal abscess. They opened the mastoid antrum and the cranium and explored the temporo-sphenoidal lobe. No pus was found; but a short distance under the cortex a hard mass was detected, that proved to be a firm, gray mass of tissue attached to the petrous bone. No attempts at removal of the growth were made. Postmortem examination showed that the tumor was attached to the floor of the middle cranial fossa, and was of sarcomatous nature. W. L. Richardson and G. L. Walton¹¹ report a case of small-cell glioma of the

¹ Arch. f. Ohrenh., Nov. 23, 1897.

² Ann. des Mal. de l'Oreille, Aug., 1897.

³ Proc. Hungarian Otol. Soc., Oct. 15, 1897; Ann. des Mal. de l'Oreille, Apr., 1898.

⁴ N. Y. Polyclinic, Nov. 15, 1897.

⁵ Jour. de Méd. de Bordeaux, Mar., 1897; and Arch. f. Ohrenh., Dec., 1897.

⁶ Arch. f. Ohrenh., Nov. 23, 1897.

⁷ Proc. Austrian Otol. Soc., Oct. 26, 1897; Ann. des Mal. de l'Oreille, Mar., 1898.

⁸ Ibid.

⁹ Zeit. f. Ohrenh.; Arch. f. Ohrenh., Dec. 17, 1897.

¹⁰ Brit. Med. Jour., Oct. 16, 1897.

¹¹ Boston M. and S. Jour., Aug. 19, 1897.

two temporal convolutions of the right side, which in its early stages gave rise to symptoms resembling those of an abscess of the brain, consequent on chronic purulent otitis media. The patient had suffered for many years from pain and discharge from the right ear.

Local Medicinal Treatment.—Local medicinal treatment of purulent otitis media forms the basis of a paper by Brieger,¹ in which he maintains that in acute purulency of the middle ear the object should be to assure the free escape of secretion and to prevent every possibility of secondary infection. All forms of poultice favor suppuration and induce necrosis. In chronic purulency we must treat symptoms. In each case the surgeon must decide for himself whether the moist or the dry form of treatment should be employed. The most important antiseptic treatment, in his opinion, is that advised by H. Schwartz—viz., by means of silver nitrate in strong solutions (50–150 gr. to the fluidounce). Brieger speaks highly of alcohol as an antiseptic, and claims for it the ability to facilitate the penetration of antiseptic solutions into the suppurating tissues. Hence the action of silver nitrate is enhanced by the addition of 50% of alcohol to the water of the solution. The satisfactory results with boric acid in powder are due not so much to its antiseptic qualities, as to its power to dry the mucous membrane and protect it from the entrance of saprophytes. Argonin has given good results in Brieger's hands, especially when an astringent preceded its use. In the discussion which followed, F. Bezold² claimed for powdered boric acid an absorbent quality, and has found it better in this respect, as a drain, than any kind of gauze tampon. The canal and the membrana tympani are not excoriated by its use. Stacke³ points out that the employment of the local remedy is less important than the consideration of the nature of the individual case, and the anatomic and pathologic changes that have taken place. Promotion of free drainage, destruction of granulations, and dilatation of small openings are indicated. In fact, a surgical treatment embracing not only these operations through the auditory canal, but also the radical operation on the middle-ear cavities, must be carried out.

It is worthy of note that Stacke,⁴ continuing the discussion, stated that the former custom of frequent syringing of the ear favored maceration of the epithelium and activity of the microorganisms in the auditory canal, which were often productive of harm. These last-named injurious effects can be prevented by using from time to time a 1% solution of silver nitrate, which is not only an excellent antiseptic, but also renders the epithelium firmer and more resistant. Scheibe⁵ maintains that iodoform and boric-acid powder in the ear render pyogenic cocci inert; and Jens⁶ uses boric acid with advantage even when the perforation in the membrana is small; but he is careful to see that the perforation does not get blocked up. In chronic purulent otitis media, Lucac⁷ has employed for two years past, with great satisfaction, formalin, 20 drops to the liter of water (about 1:1000), or weaker if this irritates. For syringing the ear he employs a syringe with the nozzle perforated on the sides, as less likely to cause vertigo. Hartmann⁸ has had excellent results with carbolated glycerin (strength not given). Beckmann⁹ thinks that medicaments do not accomplish much in chronic purulent otitis media. It is most important, in his opinion, to find out the cause of the continuance of the suppuration, whether from caries, necrosis, cholesteatoma, retention of secretion, or defective drainage through the Eustachian tube, for then the physician can apply the proper

¹ Arch. f. Ohrenh., Nov. 23, 1897.

⁶ Ibid.

² Ibid.

⁷ Ibid.

³ Ibid.

⁴ Ibid.

⁵ Ibid.

⁸ Arch. f. Ohrenh., Nov. 23, 1897.

⁹ Ibid.

treatment and obtain good results. He believes that the efficiency of boric acid is due to its disinfecting property and ability to render the Eustachian tube more permeable. Stimmel¹ recommends the application of concentrated solution of boric acid as preferable to the insufflation of powdered boric acid, as being more likely to reach all the crevices of the drum-cavity. Carboglycerin is more efficient than pure dehydrating glycerin, because of the analgesic properties of carbolic acid. Brieger² admits that carboglycerin has at times an analgesic effect; but he has found it has no therapeutic influence on the course of the inflammation. He has had no experience with formalin. [We have found a solution of formalin, 1 : 1000, very efficient.]

Thorough cleansing with antiseptics first; then, if this is unavailing, removal of the membrana tympani, malleus, and incus, to improve drainage, is approved by A. H. Buck,³ MacCuen Smith,⁴ E. B. Dench,⁵ C. H. Burnett,⁶ and J. A. Stucky.⁷ Regarding this most important subject, N. H. Pierce⁸ states that he has "come to believe, from experience, that many cases of catarrhal inflammation assume a suppurative or chronic form because of ill-advised treatment. One of the most common errors in this regard is the empirical and illogical use of ear-drops, nasal douches, and inflations." [The prime consideration in treatment of any form of otorrhea, whether acute or chronic, is the promotion of drainage. In order to do this in acute otitis it is not necessary to do much in the way of local treatment, which too frequently irritates and blocks the opening in the drum-membrane, and thus interferes with drainage. The case is thus artificially thrown into a condition demanding treatment, especially if an *artificial* mastoiditis is set up, as is too often the result. We have yet to see, after 25 years' experience, an acute mastoiditis consecutive to an acute otitis media, in a previously healthy ear, that was not the direct result of *artificial* secondary infection.] Illustrations of the evil results of neglected middle-ear suppuration, especially in children, are given by E. B. Dench.⁹ The advantages of excision of the necrotic membrana tympani and ossicles, in chronic purulency of the middle ear, are further shown by the reported experience of H. C. Fenton¹⁰ and R. Panse,¹¹ who urge the advantages of trying simple removal of the malleus and incus through the meatus, in chronic purulency of the middle-ear, before resorting to the more radical operation of Stacke through the attic and aditus.

Conservative Treatment.—Spira¹² protests against the tendency to apply radical operations in cases of chronic purulent otitis media when there are no threatening symptoms. He has found that xeroform insufflations act well and cause no retention of pus. If powder insufflations are contraindicated, he employs liquid applications, pushing them into the middle ear by pressure inward of the tragus.

Caries of the Floor of the Tympanum.—Kretschmann,¹³ in performing the radical operation of exposure of the middle-ear cavities, has often found disease of the floor or "cells" of the drum-cavity, and in 20 instances has included this region in the radical operation. Great caution is required in order to avoid injury to the facial nerve. He has not found it necessary to produce epidermization of the large wound-cavity thus made, by plastic trans-

¹ Arch. f. Ohrenh., Nov. 23, 1897.

² Ibid.

³ Brit. Med. Jour., Nov. 27, 1897.

⁴ Lancet-Clinic, July 24, 1897.

⁵ Med. News, July 3, 1897.

⁶ Internat. Med. Jour., Dec., 1897, and Phila. Med. Jour., Feb. 26, 1898.

⁷ Jour. Am. Med. Assoc., Mar. 26, 1898.

⁸ Ibid., Jan. 1, 1898.

⁹ Am. Gyn. and Obst. Jour., Oct., 1898.

¹⁰ Med. Sentinel, Sept., 1897.

¹¹ Proc. German Otol. Soc.; Arch. f. Ohrenh., Nov., 1897.

¹² Ann. des Mal. de l'Oreille, Feb., 1898.

¹³ Arch. f. Ohrenh., p. 199, Nov., 1897.

plantation of skin, because cicatrization takes place comparatively quickly and successfully without such aids.

Antrectomy.—W. A. Lane¹ sets forth the value of antrectomy as a treatment for chronic purulent otitis media. [Antrectomy is never needed—in fact, it is of no value—in the treatment of chronic purulency of the middle ear without ossiclectomy. Ossiclectomy should always precede antrectomy, either through the meatus or after removal of the scute, as in the Stacke operation, because it is easier thus to remove the ossicles while they are relatively large objects in the field of operation and not inundated with blood. If they are not removed until the large mastoid wound is made and the middle-ear cavities filled with blood, it is difficult to find them and therefore hard to remove them.] The so-called radical operation, claimed by both Stacke and Zaufal as original with them, is at present the subject of chief interest with German aurists, as described in a graphic article by J. J. Carroll.² He states that in Berlin the Zaufal-Küster method, going from the mastoid to the antrum, is preferred to the more difficult method of Stacke, which begins by opening the attic of the middle ear and working outward to the antrum and mastoid. Noltinius,³ in 132 mastoid operations in chronic purulency of the ear, performed the radical operation 107 times. E. Lombard⁴ reports a case of chronic purulent otitis media with lesions of the mastoid and petrous pyramid, causing pain in head and fever, cured by radical exposure of the middle-ear cavities. J. Gruber⁵ shows from the statistics of over 40,000 autopsies made in the General Hospital of Vienna, between 1873 and 1894, that radical operations on the ear have had a favorable effect on the mortality from ear-diseases within the last 10 years, during which latter period they have been applied. Panse⁶ has performed the radical operation on the middle-ear cavities with success in chronic purulent otitis media in children. Pollak,⁷ like Urbantschitsch and Politzer, has observed the formation of small *pearl-like bodies* (cholesteatomata) on the membrana and on the inner tympanic wall after operations upon the middle ear.

Wilde's Incision.—The inefficacy of Wilde's incision alone (incision of the soft tissues over the mastoid down to the bone) is further shown by B. A. Randall.⁸ That acute and chronic caries and necrosis of the mastoid, with their sequelæ of pachymeningitis externa and epidural abscess, are entirely relieved by prompt and thorough surgical intervention, is shown by 9 cases operated upon and reported by H. Knapp.⁹ Gorham Bacon¹⁰ looks upon elevation of temperature, though slight, combined with tenderness on pressure over the mastoid process, in a case of acute otitis media of 10 days' standing, as characteristic of mastoid disease.

Ultimate Results of Operations on the Mastoid.—This subject was discussed at the meeting of the British Medical Association held in Montreal.¹¹ Buller, in opening the discussion, considered the pathologic conditions necessitating operation on the mastoid under 2 headings: 1. "Those conditions in which the bone is inflamed and softened, with or without purulent infiltration, or mere circumscribed collections of pus, but in which there is no actual caries of the bony structures." "In this class, if decomposition of the inflammatory exudation or of the tissues involved has

¹ Clinical Jour., Oct. 13, 1897.

² Jour. Eye, Ear, and Throat Dis., Oct., 1897.

³ Proc. German Otol. Soc.; Arch. f. Ohrenh., Nov., 1897.

⁴ Ann. des Mal. de l'Oreille, Apr., 1898.

⁵ Ibid., Feb., 1898.

⁶ Ibid.

⁷ Proc. Austrian Otol. Soc., Nov., 1897; Ann. des Mal. de l'Oreille, May, 1898.

⁸ Univ. Med. Mag., Oct., 1897.

⁹ Jour. Am. Med. Assoc., Mar. 19, 1898.

¹⁰ Tr. Am. Otol. Soc., 1897.

¹¹ Brit. Med. Jour., Nov. 27, 1897.

not taken place, there is no fetid or ichorous pus. As a distinct type of mastoid disease, these cases are met during or shortly after acute purulent disease of the middle ear, and more often in adults than in children." 2. In the second class are those cases "in which actual death of the bone has occurred more or less extensively, either in the form of caries or necrosis, or both." This class is found in the more chronic forms of middle-ear suppuration, and more often in children than in adults; but by no means rarely in the latter. In these cases the carious bone may not be confined to the mastoid, but often involves other parts of the temporal bone adjacent to the mastoid or tympanum. Buller's experience is that operations in the first class have been invariably favorable "when the bone was opened before the occurrence of intracranial complications." All such recover in a few weeks after operation, even to the extent of regaining perfect hearing, and recovery is permanent. Buller also reported a case of mastoid disease with sinus-thrombosis, evacuation of the sinus, and ligation of the internal jugular vein, followed by recovery.

A. H. Buck followed Buller in the discussion, and, like him, limited his remarks "to those cases in which the disease is more or less strictly confined to the mastoid region and middle ear." Such cases may be divided into acute and chronic. "In cases belonging to the former group the operation is almost always successful; and if, in course of time, it be found that operative interference has not arrested or entirely cured the disease, the inference is warranted that our methods of procedure have been in some respects defective. In the chronic cases an equally favorable result may be expected from a thorough removal of all bone-tissue that is diseased. There, however, the interference required is apt to be much more extensive than in the acute cases. It is not always an easy matter to decide, from inspection and from the degree of firmness which the bone manifests, whether we may safely allow it to remain. A high degree of vascularity, as shown by the color and by the persistent and copious character of the bleeding from the cut surface, and especially any evidences of an established stasis in some of the vessels, should be accepted as indications that the bone so involved is not likely to return to a condition of health, and consequently should be removed. The mere presence of granulation-tissue in the *pneumatic* cells (without any recognizable amount of pus) is also a good indication that the bony framework in their vicinity should be entirely cut away. The grosser indications of disease will scarcely escape detection, provided the field of operation is made large enough to bring all the suspected parts into view."

Hugh E. Jones, in continuing the discussion, confined his remarks to the risks and complications of the operation on the mastoid. His experience is based upon about 30 cases, in which the radical operation on the mastoid and ear was performed chiefly for relief of chronic suppuration of the middle ear. No fatal result followed operative interference; but facial paralysis followed in 4 cases, twice transient and twice permanent. In order to avoid injuring the facial canal, the operator must see well into the cavity he is making in the bone. Tinnitus has not been complained of as a result of the operation. There has been no increase of the deafness; but in the majority of the cases the hearing was definitely, and in some cases greatly, improved.

C. J. Blake limited his remarks to the selection of an operation and the bacteriology, 36 cases in 3 months forming the basis of his communication. His cases are classified as: "First, cases of acute inflammation of the mastoid, originating in acute inflammation of the middle ear, confined to the contents of the mastoid process, and in which thorough evacuation of the mastoid contents and establishment of free communication with the middle

ear through the mastoid antrum, followed by *filling the operative cavity with blood*, and closure of the external wound, resulted in what was practically a healing by first intention. Second, cases of mastoid diseases in which the mastoid cortex had become more or less involved in the destructive process, and the operative procedure consisted not only in the evacuation of the mastoid contents, but also in the removal of portions of the surrounding wall without attempt at primary healing. Third, cases in which, in addition to the disease already mentioned, there was implication of structures surrounding the mastoid process, and invasion either of the cranial cavity or extrusion of the suppurative mastoid contents posteriorly toward the occiput or downward into the muscles of the neck." Blake finds that, as a rule, "the narrow, small, and pointed mastoid has a deep groove for the sinus, and a consequently small operative triangle; while, on the contrary, the broad, blunt, and rounded mastoid process is deeper posteriorly, and has an operative triangle of corresponding greater size." In review of Blake's cases, it may be said that "all of the cases of acute mastoid disease did well in the sense of rapid recovery, with 2 exceptions, and that the same may be said of 50% of the chronic cases. The other 50% of chronic cases were either very slow in healing, or required secondary operations." The streptococcus was found pure in 12 cases; staphylococcus in 5 cases; diplococcus in 6 cases; streptococcus and diplococcus in 5 cases; streptococcus and *Bacillus fetidus* in 3 cases; staphylococcus and *Bacillus pyocyaneus* in 1 case; streptococcus and diplococcus (staphylococcus?) in 1 case; streptococcus, staphylococcus, and diplococcus in 2 cases. As a rule, the same germ, obtained by paracentesis, was found later in the mastoid. Blood-counts showed that whenever pus was in contact with the dura leukocytosis was found; while with the mastoid inner cortex intact, even though the mastoid cavity was filled with pus, no leukocytosis was observed.

Extradural Otogenous Abscesses.—Collections of pus between the dura mater and the temporal bone—*extradural abscesses*—have been most ably described by C. Grunert.¹ Of 20 cases of extradural abscess occurring in Grunert's practice, 12 were from acute otitis and 8 from chronic otitis media. It is thus shown at the outset that extradural abscesses are more frequent in acute purulent otitis media than in chronic purulent otitis media. Of the 12 cases occurring in acute otitis media, in only 3 instances was the suppuration in the middle ear still active at the time of the surgical opening of the extradural suppuration. He draws attention to the fact that in those instances of acute inflammation of the middle ear in which the suppuration shows a disposition to quick cessation, extradural abscesses are most likely to occur, and not in those characterized by copious suppuration with symptoms of retention in the drum-cavity. Leutert and Zaufal are quoted as having shown that many cases of middle-ear suppuration are caused by the diplococcus and the pneumococcus; and the latter author has shown that the pneumococcus possesses a greater tendency to extend beyond the seat of original infection than the streptococcus, the most frequent cause of acute otitis media. Hence a suppuration in the ear due to the pneumococcus is most likely to spread from the middle ear, involve the cranial cavity, and induce an extradural abscess. In extradural abscesses occurring in connection with chronic purulent otitis media there are always found most pronounced pathologic changes in the middle ear. In the majority of cases cholesteatomatous formations are discovered, generally in an ichorous or purulent state. In acute cases the pathologic changes in the middle ear are slight. Like Hessler and Körner, Grunert has

¹ Arch. f. Ohrenh., Nov. 23, 1897.

found that the majority of extradural abscesses are situated in the posterior cranial fossa. It is claimed also that while attic-suppurations, when they do exert an infectious influence, produce extradural abscesses directly over the tegmen tympani, in the middle cranial fossa, such middle-ear suppurations show no special tendency to produce extradural abscesses. One of Grunert's cases of extradural abscess was situated in the region of the left foramen lacerum. It was complicated by sequestration of the point of the pyramid and defect in the dura, through which the abscess-contents forced their way into the subarachnoid space, producing a purulent leptomeningitis, destruction of the body of the sphenoid bone, and burrowing of the pus of the abscess into the soft tissues of the pharynx. At the postmortem examination it was found that a narrow fistula existed between the drum-cavity and the carotid canal, by which route pus had found its way to the apex of the pyramid of the petrous bone, and produced inflammation at that point. The size of the abscess-cavity, estimated approximately, varied in Grunert's 20 cases from that of a hazel-nut to that of a walnut. It must be borne in mind, however, that in connection with chronic suppuration in the middle ear diffuse collections of pus occur between the bone and the dura. In chronic cases the pus of an extradural abscess is usually ichorous and brownish in color; while in acute cases it is creamy and odorless. In acute cases Fränkel's pneumococcus generally plays a prominent part. In Grunert's 12 acute cases, 4 times the extradural abscess opened outward and formed a subperiosteal abscess. On the other hand, an extradural abscess is often a connecting-link between a purulent otitis media and deeper and more dangerous intracranial complications. In some instances it is impossible to say whether the extradural abscess is the cause or the effect of a deeper otitic lesion within the cranium.

Symptoms and Diagnosis.—As a rule, fever is absent in uncomplicated cases of extradural abscess. This is often unfortunate for the patient with an extradural abscess, because, though he suffer from headache and the subjective symptoms, without fever or prominent aural symptoms, his true condition is not appreciated. In 4 of Grunert's cases fever, however, was present, and these were all instances in which the abscess was extrasinual. It must be remembered, however, that fever may be due to the aural inflammation, and not to an intracranial lesion, especially when there is pus-retention in the ear. Therefore, whenever in a case of otitis media fever sets in, and by examination of the ear the latter can be excluded as the source of the rise in temperature, the surgeon is justified in suspecting an intracranial complication. Uncomplicated otogenous brain-abscess can now be excluded, as it produces no fever, as a rule. If the fever is combined with diffuse headache, giving rise to the suspicion of diffuse, purulent meningitis, even when no local symptoms are present, like paresis, Quincke's lumbar puncture may help to confirm or exclude the diagnosis of such meningeal complications. If, however, the result of the lumbar puncture as to proof of the presence of a diffuse meningitis is negative, the only conclusion left is the possible presence of a circumscribed meningitis—either an extrasinual abscess or a sinus-phlebitis—as has been shown by Leutert. A positive differential diagnosis, as a rule, is not possible at this point. It can be made only by further clinical research in a given case. If symptoms of metastases set in the diagnosis of sinus-phlebitis is assured. "It is advisable in these cases," says Grunert, "in the interest of the patient intrusted to us, not to wait until the further clinical course of the case confirms the diagnosis, but in all cases, when fever sets in and the ear-disease or a diffuse meningitis as its cause can be excluded, to expose the sigmoid fossa. . . . It is, of course, understood that thorough examination of the body has

excluded all other possible causes of the fever." Pain in the head is generally present in extradural abscess: as a rule, it is confined to the corresponding side of the head, and is often limited to the temple. In one of Grunert's cases the pain was limited to the region of the skull directly over the abscess, though the head-pains were at first intense and diffuse. The pain varies in intensity. The diagnostic value of pain depends, however, upon the exclusion of the condition of the ear and its environs as a cause for the suffering. If these regions can be excluded and simulation is not suspected, then our suspicions should be aroused that we are confronted with an intracranial complication, most probably an extradural abscess. This is rendered all the more likely if the bacteriologic examination has revealed that the primary otitis was a pneumococcus-otitis, as this germ shows a tendency to leave the ear and seek deeper cranial parts. Vertigo and disturbances in equilibrium have no value in the diagnosis of extradural abscess. The eye-ground in all of Grunert's cases of uncomplicated extradural abscess was normal. Slow pulse was observed in only 2 of Grunert's 20 cases of extradural abscess; and in 1 of these it could not have been due to pressure from the extradural abscess, which was a very small one. Locative brain-symptoms like those observed by others—*e. g.*, crossed paresis, alteration in sensibility, and disturbances in speech—were not observed in any of Grunert's cases. Local changes in the ear and its neighborhood may have some value in the diagnosis of extradural abscess; but, as Grunert thinks, only to a limited extent, as local changes in these parts are either resultant or concomitant symptoms of the original ear-disease, and are not dependent upon suppuration in the cranial cavity. However, subperiosteal abscesses behind the mastoid and swelling and edema extending far backward to the occiput, or, as in the case of abscesses in the middle cranial fossa extending above and behind the mastoid surface, the mastoid remaining free, and sensitiveness to percussion and pressure in that part of the cranial surface over the seat of the abscess, all have certain diagnostic value in extradural abscess. The abundance of the aural suppuration may be in some instances an aid in diagnosing the presence of extradural suppuration in so far, at least, as it shows that the great quantity of pus cannot come entirely from the middle-ear cavities, but must come in part from the cranial cavity; but an unusually copious flow of pus from the ear may also come from an abscess in the brain-substance. The value of an abundant discharge from the ear, as a means of diagnosis of extradural abscess, has never been pointed out before in aural literature, according to Grunert. In his opinion, when an acute aural suppuration that has been properly treated continues strikingly unabated, and local and constitutional causes for its persistence cannot be discovered, one is forced to conclude, especially when gastric symptoms, anorexia, coated tongue, and constipation are present, that possibly an extradural abscess is present. In 3 cases reported by Grunert these were the only symptoms leading to the diagnosis of the presence of an extradural abscess, which was confirmed by operation. An exact diagnosis, however, is *not possible* in extradural abscess; the surgeon must proceed with a diagnosis of probability. The diagnosis cannot be rendered certain until the mastoid is operated upon, when an external pathway is opened, and pursuing which with a chisel or a probe will lead to an extradural abscess. In this way Grunert established the diagnosis of extradural abscess in the majority of his 20 cases.

Treatment.—As the prognosis in expectant treatment is very doubtful, and as spontaneous recovery of an extradural abscess of any size has never been observed with certainty, the proper treatment can be only operative. However, the difficulty in determining the indication for operating is directly the

result of the difficulty and uncertainty in making a diagnosis. Grunert shows that positive diagnosis in his cases was not made until the mastoid was opened, and the external pathway thus exposed followed to the intracranial collection of pus. The resolve to undertake an operation is most easily made when the causative ear-disease furnishes an indication for operative treatment. If in such a case the operator finds a conducting-sinus, it is easy, with this as a help, to look for and thoroughly empty the extradural nidus. "If in a mastoid operation we find no conducting-sinus, we are justified, when we suspect, on the strength of clinical observation, the possibility of the presence of an extradural abscess, in not hesitating to open the middle and posterior cranial fossæ and seek for the extradural pus." If in such a case no pus is found in the middle or posterior cranial fossa, it is best to await the result of the mastoid operation. If the deep-seated headache and other symptoms which have led to the probable diagnosis of the presence of an extradural abscess continue after the mastoid operation, one must bear in mind the possibility that the extradural pus, sought for in vain in the middle and posterior fossæ of the skull, may be on the posterior surface of the pyramidal part of the petrous bone, or on its apex; and the surgeon should then endeavor to reach this deep-seated pus-collection by opening the cranial cavity immediately above the bony auditory canal and pushing away the dura from the petrous pyramid, as suggested by v. Bergmann. A decision to operate is still more difficult in those cases of probable diagnosis of extradural otogenous abscess in which the original ear-disease supplies no indication for operative interference; especially, as Grunert shows, in cases of so-called pneumococcus-otitis. In such cases, however, he advises us to operate first on the mastoid, even when we may not expect to find anything there demanding operation. Very often, however, the surgeon does find in such cases a sinus leading from the mastoid to the extradural collection of pus. If, however, he does not discover such a guiding pathway to the cranial cavity, *then not even a normal condition of the mucous membrane of the antrum and mastoid cells should deter him from going further and opening the cranial cavity.* When the extradural abscess is finally reached, it is manifest that it must be opened as freely as possible. It is therefore necessary, as Grunert points out, to chisel away the overlying bone as widely as the diseased area of the dura extends. It will not be sufficient to remove only so much of the bone as corresponds to that portion of it from which the pus has lifted the dura, because the two areas do not always coincide, especially in diffuse extradural pus-collections in connection with chronic purulent otitis media. Scraping granulations from the dura is also objected to by Grunert when these are of a dirty-gray color, because in such a procedure, especially when the granulations are located on the sinus, even with great care in using the curet, there is danger not only of mechanical infection of the soft meninges, but also, when the sinus is implicated, of hemorrhage from the latter. The abscess-cavity clears itself after opening and tamponading it; so that, as a rule, at the first or second change of dressing the dura mater at the base of the abscess-cavity assumes the appearance of a fresh wound-surface. The after-treatment must be conducted upon general surgical principles. In cases in which the middle-ear cavities have been laid open and the dura found to be the base of an extradural abscess, this part of the meningeal tissue forms a portion of the common aural wound-cavity, and must be included in the effort to cover the bony walls of the wound-cavity with healthy epidermis.

Results of Treatment.—Of Grunert's 20 cases,¹ the result in the 12 acute cases of otogenous extradural abscess was entire recovery in 11—i. e., in 91.7%,

¹ Arch. f. Ohrenh., Nov. 23, 1897.

in some cases within a month. One case was still under treatment at the time Grunert wrote his article. Of the 8 chronic cases, 2 recovered, 1 died later of pulmonary tuberculosis, 2 were still under treatment at the time of the report, 1 withdrew from treatment uncured, and in 2 the final result is not known. By cure is meant entire healing of the original ear-disease. Grunert is justified, therefore, in saying that the prognosis in uncomplicated otogenous extradural abscess, if operative treatment is resorted to, is favorable.

Extradural Otitic Suppurations.—Grunert¹ makes a distinction between true extradural abscesses—*i. e.*, collections of pus confined between the dura and the bone—and those extradural suppurations in which the surgeon discovers at the mastoid operation the dura more or less exposed and forming part of the wall of the purulent cavity in the mastoid. Such exposure of the dura, especially over the sinus, is so often an accidental discovery at the time of the mastoid operation, and is so seldom accompanied by any symptom leading to its suspected presence in any deeper cranial lesion, that no special clinical significance can be attached to it. "This form of exposure of the dura must be considered the result of erosion of the bone from without inward, rather than the result of the eroding action of a true extradural abscess from within outward, upon the layer of bone dividing the abscess from the mastoid cavity. This is shown to be the course pursued by the disease, from the circumstance that the broken-down region in the bone has sometimes the form of a flat funnel, the larger circumference of which is directed toward the cranial cavity. When the bone is destroyed as far as the dura, especially over the sinus, the surface of the latter is covered with granulations, forming a protecting wall against advance of the inflammation. These granulations participate in the suppuration, and in this sense we may speak of an extradural suppuration, or suppuration of the outer surface of the dura." In cases of cholesteatoma in the mastoid and when the inner wall of the latter is destroyed, usually by pressure of the cholesteatoma, the exposed dura often participates in the formation of cholesteatomatous flakes, so that the latter can be lifted by forceps from the exposed durat surface. In some instances the dura may be seen to pulsate, especially in acute cases. If, as soon as the mastoid cavity is opened, the pus escapes with marked pulsations, the surgeon may be sure the dura beyond is exposed. Marked respiratory movements of the dura, or rather of the sinus, are sometimes observed—*i. e.*, at each inspiration the sinus collapses, and at each expiration fills again. Grunert² found suppuration on the outer surface of the dura 26 times in 176 acute cases in which the mastoid operation was performed—*i. e.*, in 14.8% ; and 39 times in 573 chronic cases—*i. e.*, in 12%. As in true extradural abscesses, so in these instances of extradural suppuration, the sinus was found exposed in the acute cases more frequently than the dura of the middle cranial fossa (3 : 1). So in the chronic cases the sinus—*i. e.*, the dura of the posterior cranial fossa—was exposed more frequently than that of the middle fossa, though not in the same proportion ; in 39 cases the dura of the *posterior* fossa was exposed 27 times, and 12 times that of the middle fossa. In cases of extradural suppuration in which the sinus was exposed Grunert often observed fever, attributed, in his opinion, to the permeability of the inflamed sinus-wall to bacteria or pyogenic matter.

J. O. Green³ reports 3 cases of extradural abscess successfully operated upon. Regarding the *general principles* which should govern operations for otitic brain-disease, Green makes the following summary : "1. In otitic brain-disease early operation is advisable ; but an early exact diagnosis is often im-

¹ Arch. f. Ohrenh., Nov. 23, 1897.

² Ibid.

³ Boston M. and S. Jour., Nov. 25, 1897.

possible. 2. The chances are 79 in 100 that a fistula through the bone from the ear will lead directly to the brain-disease. This gives justification for early exploration of the bone, and as disease of the bone originates from suppuration of the ear, the ear is the cavity from which the bone should be explored, if this is possible—that is, we should follow the disease inward from its source. 3. The infected ear requires operation in any case, and this operation can be combined with an examination of the bony fistula and the recognition and treatment of the brain-disease."

Otitic Phlebitis and Thrombosis.—Otitic phlebitis, without very marked symptoms at first, excepting high fever (40° C.), in a child of 30 months, is reported by E. J. Moure.¹ The operation on the sinus was consented to too late, and the child died 36 hours after the operation. [If any operation can save these cases at any age, it must be prompt and radical. It will be less radical the sooner the surgical interference is begun.] C. Poli² reports 2 cases of sinus-phlebitis, resulting from chronic purulent otitis media, operated upon by opening the sinus and ligating and excising the internal jugular vein, one case recovering and the other ending fatally. Lermoyez³ draws attention to what he considers a hitherto-undescribed pathogenic symptom of thrombosis of the superior longitudinal sinus—viz., **dilatation of the veins of the entire scalp**. In his case, he says, "this dilatation, which could be seen only after the scalp was shaved for operation, affected all the superficial veins of the skull, in the right as well as the left side, and formed a kind of 'Medusa's head,' such as is seen on the belly of old cirrhotics." R. Hoffmann⁴ reports a case of otitic sinus-thrombosis in a child of 4 years, who had been under his treatment for 3 years for chronic otorrhea in the left ear. There were sudden pain and swelling in this region of the ear, glandular swelling in the neck and beneath the jaw, and swelling extending forward to the temporal fossa and backward to the occiput, and there was also edema of the left eyelid. The operation, in the course of a week after symptoms set in, revealed a gangrenous subperiosteal abscess with healthy mastoid cortex; in the drum-cavity granulations and cholesteatoma, caries of the hammer and anvil, and of the inner wall of the aditus, and cholesteatoma in the antrum and aditus. In the inner wall of the mastoid there was a large carious defect, by which the sinus and the dura of the cerebellum were exposed. Puncture of the sinus revealed therein a discolored gangrenous mass, and when the sinus was split open its lumen was found to extend for only about 1 cm.; centrally and peripherally it was obliterated by connective-tissue adhesion of its walls. Entire recovery ensued. In the discussion following this communication, Jansen⁵ stated that in 7 operations on the sinus, with 6 recoveries, he had ligated the jugular; while in 8 operations, with 5 recoveries, he had not ligated the jugular. He spoke of 2 cases of recovery without operation and without the demonstrable presence of a thrombus, but in which a thrombus must be supposed to have been in the jugular bulb. Habermann⁶ opposed a too arbitrary procedure respecting operations in sinus-thrombosis, especially so far as pertains to ligation of the jugular, that some consider obligatory. In a case of extradural abscess in the posterior cranial fossa and firm thrombus in the sinus the wall of the jugular vein was quite discolored. He removed the discolored part of the jugular, but left the thrombus in the sinus mostly untouched. Recovery took place. Brieger⁷ maintains that ligation of the jugular is justified only when the

¹ Jour. Laryn., Rhinol., and Otol., Sept., 1897.

² Arch. Ital. di Otol., etc., Jan., 1898.

³ Ann. des Mal. de l'Oreille, Dec., 1897.

⁴ Arch. f. Ohrenh., Nov. 23, 1897.

⁵ Proc. Deutsch. Otol. Soc.; Arch. f. Ohrenh., Nov. 23, 1897.

⁶ Arch. f. Ohrenh., Nov. 23, 1897.

⁷ Ibid.

thrombus has already extended into the jugular and cannot be positively prevented from passing toward the heart. The closure of this pathway does not always insure against the escape into the circulation of particles of a broken-down thrombus. In a case of sinus-phlebitis in which Brieger ligated the jugular low down embolic lung-processes were set up. Successful operations on the lateral sinus for otitic thrombosis are reported by C. Barck,¹ G. A. Leland,² Hoffmann,³ and F. Whiting,⁴ who thinks double ligation of the jugular preventive of metastases, as do Grunert⁵ and H. A. Alderton;⁶ and unsuccessful ones by H. A. Alderton,⁷ G. A. Leland,⁸ and V. Barck.⁹ All writers on this subject urge *prompt* and radical operation as the only means of saving the life of the patient.

Otitic Pyemia.—Eulenstein¹⁰ reports 2 cases of acute otitis media followed by pyemia: one, in a boy of 14, proving fatal; the other, in a girl of 12, recovering. In both cases the mastoid was opened and granulations and pus removed. The author of the paper thinks the clinical aspect of these cases is influenced by the virulence of the toxic substances absorbed. In the first case death occurred before all the symptoms of true pyemia appeared; whereas in the latter the symptoms were more nearly typical, yet recovery ensued. He also thinks it doubtful whether a thrombus—at least a complete one—is present in every case of otitic pyemia. They should be sought, however, in every case. Heimann¹¹ exposes the mastoid cells, the cranial cavity, and the lateral sinus at one sitting in cases of otitic pyemia. K. Schmidt,¹² in reporting 8 cases of otitic pyemia, says that no definite rules for operation can be laid down. It is best to expose the middle-ear cavities, the attic, the antrum, and the mastoid cells, and finally enter the cranial cavity as guided by the diseased tract laid bare by the operation. No time should be lost in operating. We may thus prevent entrance of infectious matter into the blood and the meninges. In the discussion which followed, it was plainly shown that otitic pyemia may occur without thrombosis. Sinus-phlebitis and phlebitis in the jugular with pyemic symptoms may be well marked, and yet no thrombosis ensue, especially if early operation removed the purulent nidus near the sinus. The phlebitis thus escapes further infection and a thrombus is not formed, as gleaned from the remarks of Heimann, Jansen, Politzer, Kayser, and Uebermann. Pyemia of aural origin, but without thrombosis, is not unfrequently seen in the course of an acute otitis media. Thrombosis is more likely to occur in connection with chronic purulent otitis media, according to Luc.¹³ He points out that in many instances the only distinguishing feature at first, between intermittent fever and aural pyemia without sinus-thrombosis, is the aural discharge and pain. The latter may be intermittent with the rise and fall of body-temperature. The metastases in these cases consist in inflammations in the joints and in the calves of the legs, generally followed, however, by recovery under an antiperiodic and supporting treatment; whereas, the metastases in thrombosis occurring in chronic purulent otitis are usually in the lungs, pleura (Kayser and Schmiegelow), or liver (C. H. Burnett). Luc gives 2 cases of aural pyemia in the course of acute purulent otitis in children of 10 and 8 years respectively, both of which recovered. Voss¹⁴ has observed that in some cases ligation of the internal

¹ Ann. of Otol., Rhinol., and Laryn., Nov., 1897.

² Arch. f. Ohrenh., Dec., 1897.

³ Münch. med. Woch., Dec. 14, 1897.

⁴ Ibid.

⁵ Ibid.

⁶ Ann. of Otol., Rhinol., and Laryn., Nov., 1897.

⁷ Zeit. f. Ohrenh., Band xxx.; Arch. f. Ohrenh., Dec. 17, 1897.

⁸ Proc. Internat. Med. Congress, Moscow; Arch. of Otol., Feb., 1898.

⁹ Ibid.

¹⁰ Méd. mod., July 10, 1897.

¹¹ Ibid.

¹² Tr. Am. Otol. Soc., 1897.

¹³ Arch. of Otol., Feb., 1898.

¹⁴ Tr. Am. Otol. Soc., 1897.

jugular did not prevent metastases. He thinks the chances, however, are better when the jugular is ligated. In the same discussion Uchermann maintained that ligation of the jugular need be undertaken only in commencing pulmonary infarction. Voss has had better success with ligation of the jugular in children than in adults. Exposure of the sinus by the continuation of a previous antrum-operation is, as a rule, not only the proper surgical procedure, but the quickest route to the sinus, as the distance of the sinus is often less than $\frac{1}{4}$ in. from its suprameatal fossa, "the spine beneath the latter being the proper point to enter for exposing the antrum." R. F. Weir¹ states that in former days sinus-thrombosis terrified the surgeon; now it is even more satisfactory to treat than ordinary cerebral abscess, because its symptoms are usually recognized quite promptly and the cases are treated with facility by those who, by observation and some experience, had acquired the necessary boldness. Although sinus-hemorrhage is alarming to witness, we have learned that it is more easily controlled than that from any of the large veins. Chipault² has successfully combated otitic phlebitis of the lateral sinus by prompt and radical surgical measures, and recommends them in all cases. Thus, in 180 cases, 16 cures and 21 deaths occurred after treatment by simple mastoidectomy; 17 cures and 15 deaths after mastoidectomy, exposure of the sinus, opening the latter and washing it out; 3 cures and 18 deaths after lavage of the sinus associated with ligation of the jugular. Chipault concludes that the more radical the interference the better the results. He has therefore suggested an original and most radical measure, which, however, has not been carried out by anyone until recently, when it has been applied by Lambotte, of Antwerp. This original proceeding is as follows: It possesses the advantage of isolating completely the septic nidus in the sinus from the rest of the venous current. It consists of 3 steps: 1. Double ligation of the internal jugular in the neck, with excision of the vein between the 2 points of ligation at the upper end in the upper angle of the cervical wound. 2. Ligation of the transverse sinus as near as possible to the torcular Herophili—*i. e.*, near the occipital protuberance. 3. An attack upon the septic foyer by means of ablation of the osseous lesions in the mastoid and antrum, generous exposure of the sinus-groove, evacuation of pus about the sinus and septic products within the sinus, and opening, by the resection of the anterior osseous wall of the sigmoid groove, the bulb of the jugular infected by the antral veins. Finally, the establishment of drainage of the jugular sinus in order to make ultimate lavages twice a day. "Isolation" should always be obtained before "evacuation," in order to avoid dispersion of septic emboli, which the latter operation might detach from the clot. In delicate subjects 2 *séances* may be necessary to perfect these maneuvers. The ligations are only palliative; the **curative** interference consists in the removal of the septic lesions in the antrum, mastoid, sinus-groove, and the sinus itself.

OTITIC MENINGITIS.

Meningitis from Acute Otitis.—Castaneda observed fatal meningitis resulting from an acute otitis media in a previously healthy ear in a man of 50. There were general convulsions, converging strabismus, and a temperature of 39.8° C. An autopsy could not be obtained.

Otitic Leptomeningitis.—In 3 cases Grunert³ performed lumbar

¹ N. Y. Polyclinic, Jan. 15, 1898.

² Bull. de l'Acad. de Méd., Feb. 2, 1897; Ann. des Mal. de l'Oreille, Apr., 1898.

³ Münch. med. Woch., Dec. 14, 1897.

puncture for the diagnosis of suppurative leptomenigitis of otitic origin, in two of which positive results in guidance were obtained, the third dying under chloroform-narcosis. J. E. Sheppard¹ reports 3 fatal cases of otitic meningitis, 2 of which were associated with epidural abscess.

Acute Serous Meningitis.—G. Boeninghaus² has made an investigation into the nature and forms of acute serous meningitis, to which attention was called some years ago by Quinke. Two forms may be distinguished—viz., a **malignant** form, a meningoenephalitis, that runs a rapid and fatal course, and in which death occurs before the exudation can become purulent; and a **benignant** form, in which the inflammation is limited to the pia and the ventricles. The exudation remains serous. Lumbar puncture does no good in these cases; but puncture of the ventricles is indicated. Not only the latter procedure gives relief, but in some cases simply opening the dura and the consequent brain-prolapse relieve the choked ventricles. It is a striking fact that, relatively frequently, purulent otitis media causes the disease just described. Kretschmann³ reports a case of meningitis serosa, originating from cholesteatoma of the middle ear, relieved by operation.

OTITIC CEREBRAL ABSCESS.

Psychic Symptoms of Abscess of the Temporal Lobe.—Castafieda⁴ noted loss of memory as the only psychic symptom in a case of suspected otitic abscess of the temporal lobe in a child of 7 years.

Endocranial Complications of Chronic Purulent Otitis Media.

—G. Gradenigo⁵ points out that operations for the relief of intracranial lesions of otitis media would be more successful if the diagnosis were more certain before operating; exploratory operations are often useless and are sometimes dangerous, as they hasten unfavorable termination of preexistent lesions or induce the formation of new ones. Aside from localizing symptoms, which, of course, are highly valuable when they occur, the chief symptoms of endocranial lesions are optic neuritis, headache, slowness of the pulse, rigidity of the neck or the nucha, difficulty of deglutition, vertigo and nausea, fever, and alteration in the patellar and superficial reflexes. 1. Optic neuritis is a valuable symptom, frequent in brain-abscess, less common in meningitis, and usually not observed or only slightly marked in uncomplicated thrombosis of the sinuses; it is sometimes found in connection with extradural abscess. 2. Headache is one of the most frequent symptoms of endocranial complications; it is always present in cerebral abscess, and is very intense in leptomenigitis, though in some cases it is absent; it is usually absent in uncomplicated thrombosis; it must be borne in mind that intense headache may be present in syphilitic otitides; it is also present in a stubborn and intense degree in young, nervous, and hysterical subjects affected with otorrhea. 3. Slowness of the pulse is an important symptom of brain-abscess or of incipient meningitis; it is often absent, unfortunately. 4. Rigidity of the nucha or of the neck is often seen, but depends upon diverse causes; it may be found in meningitis, cerebellar abscesses, and septic thrombosis of the sinus. 5. *Difficulty of deglutition*, when not dependent upon pharyngeal inflammation, indicates thrombosis of the sinus (complicated by secondary abscesses in the neck), and deserves more attention than it obtains; it is probably more frequently present than is supposed. 6. Vertigo and nausea are symptoms of acute purulent inflammation of the

¹ Arch. of Otol., July, 1897.

² Arch. f. Ohrenh., Dec. 17, 1897.

³ Münch. med. Woch., No. 16, 1896, and Archiv. f. Ohrenh., Dec., 1897.

⁴ Am. Medico-Surg. Bull., June 10, 1897.

⁵ Ann. des Mal. de l'Oreille, Feb., 1898.

labyrinth and of incipient consequent leptomeningitis; they are also symptoms of uncomplicated sinus-thrombosis and of cerebellar abscess. 7. Fever does not usually appear in cerebral abscess until near the end, and is generally high; it persists throughout purulent leptomeningitis and assumes a pyemic type in thrombosis; it is generally absent at the beginning of meningitis, and may never be of the pyemic type in thrombosis. 8. Patellar and superficial reflexes are generally absent in meningitis, and are exaggerated, especially on the side opposite the lesion, in cerebral abscesses; they are, as a rule, unchanged in uncomplicated sinus-thrombosis.

Abscess of the Temporal Lobe.—W. Kümmel¹ reports a case of double abscess (by encapsulation) of the temporal lobe, the result of acute otitis media following an eruptive fever in a girl of 3 years, 6 months before she was seen by Kümmel. An otogenous abscess in the temporal lobe, cured by operation on the mastoid and then on the squama, is reported by Grunert.² The chronic purulency of the ear, the source of the infection of the brain, was also permanently cured by surgical exposure of the middle-ear cavities. In a man of 30, purulent otitis media of long duration produced at last perforating necrosis of the tegmen tympani and abscess of the temporal lobe, as reported by W. Kümmel.³

C. H. Burnett and H. A. Wharton⁴ observed an otitic extradural abscess, accompanied by an abscess of the temporal lobe, in a man of 30, the subject of chronic purulent otitis media since his childhood. A week before being seen by Burnett and Wharton the patient had complained of earache and headache, culminating in unconsciousness and convulsions on the sixth day of the attack. Then came a period of consciousness, with defective mentality and paraphasia, but no pain. Exposure of the middle-ear cavities showed that the necrosis had spread from the middle ear and antrum to the attic and the tegmen tympani. Trephining over the squama permitted escape of extradural pus, but gave no relief to the paraphasic symptoms. The latter increased, passed into aphasia with paresis of the entire right side, opposite the diseased ear, and coma set in. The temporal lobe was now punctured and half a fluidounce of offensive pus escaped; but the temperature, which had been fluctuating, began to rise, reaching 106.4° F. the third day after the operation, when the man died. No postmortem was obtained.

Small abscesses in the temporal lobes and abscesses in the right temporal lobe may run their course without central symptoms, as shown by Oppenheim.⁵ Optic-acoustic aphasia is the usual symptom of abscess in the left lobe. The same symptom may be present with an abscess in the right temporal lobe of a **left-handed** subject. However, the diagnosis of an abscess of the right temporal lobe is far more difficult than that of the left, since the physician must be guided by the existence or discovery of symptoms that are termed indirect, or symptoms of contiguity, as shown by E. Kalmus⁶ in reporting a case in the practice of Pica.

Abscess of the Temporosphenoidal Lobe.—An abscess in the temporosphenoidal lobe, followed by purulent leptomeningitis, is reported by A. Barkan,⁷ and with an abscess of the temporal lobe observed by Steinbrügge,⁸ in a soldier of 23, affected since childhood with a slight, chronically recurrent purulent otitis media on the left side, in addition to the ordinary symptoms of cerebral abscess, low temperature, slow pulse, coated tongue, and paraphasia,

¹ Arch. of Otol., Oct., 1897.

² Arch. of Otol., Apr., 1898.

³ Nothnagel, Spec. Path. u. Therap., 1897.

⁴ Arch. of Otol., Oct., 1897.

⁵ Arch. f. Ohrenh., Dec. 30, 1897.

⁶ Am. Jour. Med. Sci., Nov., 1897.

⁷ Prag. med. Woch., Dec. 23 and 30, 1897.

⁸ Deutsch. med. Woch., Oct. 7, 1898.

there was ptosis of the upper lid of the left eye. The latter symptom was supposed to be due to pressure of the abscess upon the trunk of the oculomotor nerve close to the insertion of the tentorium cerebelli, where the nerve passes beneath the dura, and is considered by the author to be a valuable symptom of the presence of an abscess in the temporal lobe when it occurs on the side of the affected ear. Operation on the mastoid and antrum gave no relief. Steinbrügge thinks that a simultaneous opening of the cranial cavity through the squama would have saved his patient. The ruptured abscess-cavity was discovered after death. A temporosphenoidal abscess, the consequence of chronic suppuration of the middle ear, cured by operation, is reported by W. Milligan.¹ The diagnosis was based on the low temperature (97.4° F.) and slow pulse (60) just before the operation.

Littaur and Mensing² report a case of chronic purulent otitis media in which there suddenly occurred chills, vomiting, and severe pain in the ear, followed by thrombophlebitis of the jugular and of the facial vein, and phlegmon of the orbit on the same side as the diseased ear. The patient seemed to improve after a mastoid operation, ligation of the jugular, and finally incisions over the facial vein and about the orbit, followed by drainage by means of tubing. Suddenly, on the forty-first day, symptoms of abscess in the temporal lobe supervened, and death occurred the next day. G. N. Wolf³ reports 9 personal observations of cerebral abscesses, with autopsies. According to the investigations of L. Emmett Holt,⁴ cerebral abscess is rare in children under 5 years old.

Brain-abscess, Double.—P. Manasse⁵ has reported an extraordinary case of bicameral otitic cerebral abscess, with fistula into the ventricles and optic aphasia. The patient, a woman of 42, had suffered from chronic purulency in the left ear since typhoid fever in childhood. An abscess in the temporal lobe being diagnosed, radical exposure of the middle-ear cavities, and eventually of the cranial cavity, was followed by recovery in 4 months.

Brain-abscess; Spontaneous Opening.—Urbantschitsch⁶ has observed a case of what seems to have been spontaneous discharge of a cerebral abscess through the tegmen tympani and the external ear after a radical mastoid operation.

Abscess of the Occipital Lobe.—An otitic abscess in the **occipital lobe** of the brain occurred in a case with unusual ear-symptoms observed by J. Morf.⁷ The patient, a man of 56, took cold and suffered from pain in his right ear and occiput. There was no discharge from the ear at any time. Paracentesis was performed without evacuation of any fluid; and there was no deafness. Pain continued for 2 months, when the patient consulted Morf for the first time. Death occurred without evacuation of the bicameral abscess in the occipital lobe discovered after death. An otogenous abscess in the occipital lobe, causing death by rupture into the lateral ventricle and paralysis of the breathing-center, is reported by Grunert.⁸ The subnormal pulse did not make its appearance until a short time before death in this instance, there having been continued fever, due to the cerebritis about the abscess.

Cerebellar Abscess.—A case of chronic purulent inflammation of the middle ear on both sides is reported by Thomas Barr.⁹ This case proved

¹ Jour. Laryn., Rhinol., and Otol., Nov., 1897.

² Proc. Western German Otol. Soc., Nov. 7, 1897; Ann. des Mal. de l'Oreille, Apr., 1898.

³ Thèse de Strasbourg, 1897.

⁴ Tr. Am. Pediat. Soc., May, 1897.

⁵ Arch. of Otol., Apr., 1898.

⁶ Proc. Austrian Otol. Soc., Nov. 30, 1897; Ann. des Mal. de l'Oreille, May, 1898.

⁷ Arch. of Otol., July, 1897.

⁸ Arch. f. Ohrenh., Dec. 30, 1897.

⁹ Arch. of Otol., July, 1897.

fatal after 7 years by extension on the left side through the labyrinth-cavities and the canals of the auditory and facial nerves to the interior of the cranium. The middle-ear cavities were opened by operation, as were also the sigmoid sinus and the dura mater at the floor of the middle cranial fossa. Death was caused by cerebellar suppuration and general leptomeningitis. Barr suggests, in concluding the history of this case, that "we should, when operating on the antrum, examine closely the state of the posterior part of the labyrinth," for if the labyrinth is involved in the suppurative disease, "the probability is that the intracranial lesion is under the tentorium in connection with the anterior part of the cerebellum, in the neighborhood of the internal auditory meatus."

Barr¹ has recorded another case of cerebellar suppuration caused by middle-ear infection through the internal auditory meatus, with thrombosis of the cavernous sinuses and basic leptomeningitis. In this instance the necrotic process passed from the middle ear through the inner tympanic wall at the oval window into the internal ear, and finally from the vestibule through the posterior surface of the pyramid to the cerebellum. There seem to have been no symptoms in this case pointing either to cerebellar disease or involvement of the cavernous sinuses. [An attempt should be made to relieve such cases by chiselling directly along the pathway of infection from the inner tympanic wall through the labyrinth until the infected area of the dura and cerebellum is reached.]

¹ Arch. of Otol., July, 1897.

DISEASES OF THE NOSE AND LARYNX.

BY E. FLETCHER INGALS, M. D., AND HENRY G. OHLS, M. D.,

OF CHICAGO.

Review of the Year's Work.—The year has been marked by a large amount of practical work along lines of former activity. While not producing great discoveries, many minor improvements in the technic of operations, as well as in the more definite indication for the use of remedies, have been developed. A few simple instruments, well constructed and admirably adapted to facilitate various operations, are portrayed. The subject of anesthesia, both general and local, was fully treated by Gibb; while local anesthesia received special attention from Wroblewski, Armstrong, and Newcomb. Some obscure cases of parotitis were observed by Gibb and Ewing. Seldowitsch removed a mass of thyroid tissue from the base of the tongue, the patient later developing myxedema. The etiology of exophthalmic goiter was exhaustively studied by Cobb. Root points out clearly the importance of bacteriologic study in arriving at the diagnosis of diseases of the throat. Tonsillotomy has, as usual, been extensively exploited by various writers. The various methods of relieving nasal obstruction by operations on the septum and turbinates have been extensively considered. The septum operation was especially advocated by Coolidge. Lake and Grant advocate partial turbinotomy. Deviation of the septum, the *bête noir* of nasal surgery, has, as usual, called out a variety of more or less inefficient procedures. The symposium on *Myasis narium* apparently left little to desire in the treatment of these troublesome parasites. The various nasal reflexes and their relations with distant organs have been entertainingly described by Mackenzie and Grayson. Coffin gives a method for the differential diagnosis of sinusitis. The importance of the microscopic diagnosis of carcinoma of the larynx was pointed out by Chiari, Krause, and others.

Anesthesia.—Joseph S. Gibb¹ reviews the indications for general and local anesthesia. The former he recommends in the following intranasal operations: 1. Major operations involving considerable dissection. 2. Large bony deflections requiring breaking the septum at its base. 3. Large bony spurs. 4. Congenital or acquired stenosis. 5. Plastic operations. Ether is the safest anesthetic and the Trendelenburg the preferable position. For operations on adenoids in children he commends nitrous oxid gas, as commonly used in English hospitals. In private practice he notes the ease of chloroform-anesthesia, but calls attention to 9 deaths in 1 year from its use in England.

Ethyl bromid is safest and most widely useful. Its administration may be preceded by inhalation of nitrous oxid gas. If ether is used, it should be pushed to the stage of complete relaxation. Pharyngeal operations on adults can generally be done with the least discomfort under eucain-anesthesia. In

¹ Jour. Am. Med. Assoc., Mar. 5, 1898.

children the gas is indicated for tonsillotomy. Cocain is preferable for endolaryngeal operations, as it is less irritating than eucain. [For operations on septal spurs and all other intranasal work local anesthesia is far preferable on account of the ease with which the field of operation can be seen. Operations can thus be performed more thoroughly.] For **anesthesia** through a **tracheal tube**, Thomas Annandale¹ leads a rubber tube from the tracheal cannula to a tumbler in which there is a sponge or cotton moistened with the anesthetic. It is less irritating and does not interfere with operative procedures.

Local Anesthesia.—Wroblewski,² for operations in the pharynx and larynx, applies a 10% solution of **cocain**, followed by parenchymatous injection of 50% **antipyrin**, the dose of the latter being 3 to 6 gr. Invariably complete local anesthesia ensues in from 10 to 15 minutes, and lasts 8 to 12 hours.

W. Jobson Horne and MacLeod Yearsley³ found **eucain** a satisfactory and safe substitute for cocain, using for examinations a 4% solution, and for operations an 8% or 10% solution. Anesthesia lasted 15 to 20 minutes, and no toxic effects were observed. Gibb⁴ suggests that the so-called symptoms of intoxication from cocain may be largely due to shock from the operation. [Such symptoms are sometimes due to fright at the operation, and occur even before the cocain is applied.] H. L. Armstrong⁵ recommends a nasal spray containing 10 gr. each of eucain and cocain to 6 oz. of water for various affections, claiming that the anesthetic effect of the eucain, by preventing nervous excitation, avoids the danger of acquiring the cocain-habit. [We believe any protracted use of cocain is dangerous, and that it should not be prescribed.] J. E. Newcomb⁶ reports using **guaiaicol** 36 times as a local anesthetic in the nose, pharynx, and larynx, with perfect anesthesia in 14, partial in 18, none in 4. He concludes that it cannot be considered superior to cocain in any respect, but while unpleasant it may be substituted when cocain is contraindicated. Lichtwitz and Sabrazes⁷ found that **orthoform** relieved the dysphagia due to tuberculosis and cancer of the larynx and that following the removal of the tonsils with the hot snare. Pain was relieved for 24 to 48 hours and subsequent anesthesia was more readily obtained. This is due to its sparing solubility, which also demands frequent applications if the affected area is often disturbed. [We have found it an excellent application, after nasal operation, to check hemorrhage and relieve pain.] E. S. Yonge⁸ found it nontoxic, anesthetic, and analgesic when applied to ulcers, but not sufficiently anesthetic for surgical operations on unbroken surfaces.

Parotitis from Obstruction to Stensen's Duct.—R. Hill Brown⁹ removed a small feather from Stensen's duct, with rapid relief of an acute parotitis caused by the obstruction. Fayette C. Ewing¹⁰ describes recurring parotitis, generally unilateral, at intervals of a few months to a year, from the age of 2 to 8 years, in his son. The gland swells rapidly and becomes somewhat tender; but there is no fever, and the swelling subsides within 3 days without treatment. He considers it due to simple infectious disease of the duct. W. Freudenthal¹¹ describes 3 cases of **salivary calculi** in Wharton's duct or in the submaxillary gland. In 1 case the swelling resembled a ranula; but on incision a calculus was removed. He quotes cases

¹ Lancet, Mar. 6, 1898.

³ Jour. Laryn., Rhinol., and Otol., Nov., 1897.

⁵ Jour. Am. Med. Assoc., Aug. 7, 1897.

⁷ Bull. méd., Nov. 21, 1897.

⁹ Lancet, Apr. 16, 1898.

² Medicine, Feb., 1898.

⁴ Op. cit.

⁶ N. Y. Med. Jour., Aug. 28, 1897.

⁸ Brit. Med. Jour., Feb. 5, 1898.

¹⁰ Jour. Laryn., Rhinol., and Otol., Apr., 1898.

¹¹ Jour. Am. Med. Assoc., Feb. 26, 1898.

in which dyspnea was caused by large calculi, and 1 case of his own in which death resulted from suffocation in a drunkard. The pus from chronic inflammation of the duct causes obscure dyspepsia when swallowed.

Leukoplakia Buccalis.—Kyle¹ prescribes a wash of potassium chlorate, and has the white patches touched daily with pure tincture of iodine. For internal use he prescribes arsenic sulphid, gr. $\frac{1}{24}$. [The galvanocautery has given the best results, but during the past year we treated 1 case successfully by the application of lactic acid.]

Measles-eruption in the Mouth.—Koplic² describes the eruption of measles which appears first on the mucous membrane of the lip, and cheek, but not on the hard and soft palate. The eruption consists of small irregular bright-red spots, with a small bluish-white speck in the center of each spot. As the skin-eruption appears the background becomes a diffuse red, with a large number of bluish-white specks over it. This appearance soon after fades. In r  theln and influenza the mucous membrane remains normal. In aphthae the spots are less red and do not present the bluish-white specks.

Edema of the Palate.—Timothy J. Reardon³ reports an unusual case of suddenly appearing edema of the superior surface of the soft palate. Incision rapidly reduced the swelling. He thought the edema was due to attempts to dislodge crusts formed by suppuration in the recessus medius. The appearance resembled an emphysema. Gaudier⁴ describes a case of edematous urticaria of the mucous membrane of the mouth of a medical student, without external eruption. Scarification of the uvula, boric-acid mouth-washes, and active purgation gave quick relief. The condition appeared 2 hours after a meal of snails. Albert N. Blodgett⁵ reports a boy of 14 years with complete destruction of the soft palate, due to inoculation with syphilis when vaccinated 3 years before. Samuel G. Dabney⁶ reports a case of tuberculous ulceration of the soft palate following a slight acute nasopharyngitis and succeeded by tuberculous laryngitis. Lactic acid, 50 %, iodoform, and other local remedies, and also oxytuberculin and Paquel's tuberculin, were used, with little effect. No involvement of the lungs was diagnosed.

The Tongue.—W. E. Casselberry⁷ describes 2 cases of **Ludwig's angina**. The first followed and was due to infection from a peritonsillar abscess opened a week earlier. Repeated punctures and incisions failed to locate pus. Death from edema of the lungs followed a delayed tracheotomy. The second case made a slow recovery after evacuation of an abscess in the region of the right sublingual gland. No involvement of the lungs was diagnosed. H. Foster⁸ removed a **lipoma** from the tongue of a man, aged 62, 5 years after the growth was first noticed. It caused no pain, but great mental depression from the fear that it was malignant. The operation was done with the cold snare, followed by cautery to the base of the growth.

Chronic Abscess of the Tongue.—C. W. Richardson,⁹ when treating a young lady for catarrh, noted a smooth oval swelling on the base of the tongue, covered with pale but tense mucous membrane. As it had been there from early childhood without inconveniencing the patient she declined surgical interference. The writer thought it was a dermoid or a simple cyst. Later an intense erythema and soreness of the lateral wall of the pharynx supervened. Upon examination of the throat great tenderness of the base of the tongue

¹ N. Y. Polyclinic, Oct. 15, 1897.

² Ibid., May 17, 1898.

³ Boston M. and S. Jour., Aug. 5, 1897.

⁴ Jour. Laryn., Rhinol., and Otol., June, 1898.

⁵ Jour. Am. Med. Assoc., Feb. 26, 1898.

⁶ Boston M. and S. Jour., Dec. 9, 1897.

⁷ Echo M  d. du Nord, Aug. 8, 1897.

⁸ Am. Therapist, Mar., 1898.

⁹ Laryngoscope, June, 1898.

was elicited upon firm pressure. Free incision into the mass gave exit to a large amount of thin, offensive pus. At no time did the symptoms point directly to the seat of the trouble.

Frank A. Bottome¹ obtained rapid relief from the cough, irritation, and tendency to the rapid tiring of the voice due to **congestion** of the veins at the **base of the tongue**, by superficial cauterization with a broad, flat electrode. [We would prefer to destroy accurately the dilated vein by a pointed electrode.] Dundas Grant² reported a similar experience where cauterization of varicose veins in this region relieved suffocative attacks in a nervous woman. He attributed the result to psychic rather than to local effect.

Lingual tonsil hypertrophy is discussed by James J. Bowen,³ who finds destruction of the mass by galvanocautery the ideal treatment. The application of an electrode to 2 or 3 of the largest nodules is sufficient. He also quotes from Polyak a case of typical follicular inflammation of the lingual tonsil associated with edema of the epiglottis. Clarence C. Rice⁴ cauterized the large masses represented in Fig. 86 for the relief of a sensation of fulness in the throat, with severe choking-spells at night. O. A. M. McKinnie⁵ thinks that the predisposing cause of these enlargements is a congenital or acquired debility of the vasomotor system, as in abnormal turbinates, and that most cases are chronic from the start. For slight hypertrophy he applies solutions of silver nitrate, 60 to 120 gr. to the ounce. Nodular growths he removes preferably by the cold snare. Pain generally lasts 3 or 4 days after removal and is severe upon swallowing. Finally he calls attention to the importance of investigating the lingual tonsil in persistent hoarseness, laryngitis, and cough not otherwise accounted for. Seldowitsch⁶ removed by galvanic snare a cherry-sized tumor from the base of the tongue of a 14-year-old girl. Upon examination it proved to be thyroid tissue. Seven months later the girl presented a marked myxedema with especially pronounced intellectual changes. No thyroid gland could be felt in the neck. Thyroidin produced a complete cure. J. F. Barnhill⁷ leaves tumors in this region alone if they do not cause annoyance. The discomfort or irritation caused by a growth at this point depends more upon the conformation of the epiglottis and the condition of the nervous system than upon the size of the growth itself.

The Thyroid Gland.—William L. Ballenger⁸ attributes to the thyroid gland the excretion of an antitoxin to other poisons in the circulation. Thus he classifies extensive destruction of the gland as a cause of autointoxication. O. Wunderlich⁹ treated with thyroid tablets a girl of 9 who was stunted in development, but had a bright mind. She had only 1 permanent tooth, her skin was harsh, and her hair brittle. Rapid growth and development followed the use of thyroid. The gland was apparently deficient. George H. Cobb¹⁰ discusses the etiology of **exophthalmic goiter**. The theory that it was due to circulatory changes he dismisses as untenable. That it is due in some cases to derangement of the sympathetic system he admits. The toxic theory, however, seems to account for all the symptoms. From this point of view it may be considered the opposite of myxedema, the former being the result of excessive secretion; the latter, of deficient secretion by the thyroid. Thus

¹ Laryngoscope, Jan., 1898.

² N. Y. Med. Jour., Dec. 25, 1897.

³ Va. Med. Semi-monthly, Aug. 13, 1897.

⁴ Am. Medico-Surg. Bull., Sept. 10, 1897, quoted from *Centrahl. f. Chir.*, No. 17, 1897.

⁵ Laryngoscope, Aug., 1897.

⁶ Brit. Med. Jour., Nov. 13, 1897.

⁷ Jour. Laryn., Rhinol., and Otol., July, 1897.

⁸ Post-Graduate, May, 1898.

⁹ Medicine, Nov., 1897.

¹⁰ N. Y. Med. Jour., July 3, 1897.

also thyroid injection relieves myxedema; while in the normal individual the same doses cause all the symptoms of morbus Basedowii except exophthalmos. As to treatment, he, of course, condemns thyroid feeding, nor does he expect much from the introduction of thymus. Rest, milk-diet, hydrotherapy, and massage have given good results. Galvanization and faradization of the neck are advisable, as also ice-bags over the neck and heart and iodine applied over the gland. Belladonna internally to check secretion; digitalis for asystole; strophanthus, gradually increased to 75 minims daily, are all indicated. 90% of the cases are anemic and require iron or iron and arsenic. [We have found strophanthus usually the most satisfactory internal remedy, but have seen benefit in a few cases from the use of desiccated thyroids.]

P. W. Watson,¹ in a discussion of **rheumatic and gouty affections of the throat**, claims that a large majority of cases of acute follicular tonsillitis are rheumatic [this is an old claim that has not been verified in our experience]. He quotes De Havilland Hall² to the effect that the pharyngeal tonsil may be thus affected severely without involvement of the faucial tonsils. He quotes Freudenthal,³ who states that he has repeatedly seen benign ulceration of the pharynx yield to antirheumatic drugs. [Was potassium iodide the remedy used?] These ulcers were solitary and healed without cicatrix. Gouty pharyngitis he finds even more common. The acute attacks are painful and present the appearance of intense patchy congestion, with a glazed, irritable surface. The local may alternate with constitutional symptoms. The thickening of the lateral walls of the pharynx he finds characteristic of gout. Local treatment is limited to soothing sprays or pastils. Constitutional treatment is always indicated. [His description of gouty pharyngitis does very well for the rheumatic form, which we find much more common.]

Pharyngeal Nystagmus.—H. Lambert Laek⁴ describes the case of a girl, aged 19 years, whose pharynx presented rhythmic, jerky lateral movements, about 150 per minute. There was no evidence of brain-lesion. Her general health was excellent. Treatment of a postnasal catarrh for 3 months stopped the formation of crusts, and the movements of the pharynx ceased a month later. A jerky movement of the vocal cords upon inspiration was noted in the same case. This also subsided with improvement of the pharyngeal tremor.

Pharyngeal Urticaria.—J. M. Taylor⁵ relates the case of a young lady who developed sudden severe dyspnea while attempting to sing. A spray of antipyrin and cocaine gave prompt relief. The cause of the dyspnea was revealed in about 10 minutes by the eruption of urticarial wheals on the skin, rapidly covering the whole surface. She gave a history of previous attacks, but never involving the throat.

Joseph Gibb⁶ gives a classification of ulcerations of the pharynx and larynx. See tables on pages 842, 843.

Recurrent Membranous Pharyngitis.—John M. Hunt⁷ had a patient who, for 19 years, at intervals of 10 to 14 days, had attacks of membranous sore-throat, limited to the left side. No sooner did the membrane clear up than a fresh attack began, with the exception of 4 months, when she was confined to bed. Suspecting that she caused the attacks herself, he investigated her drug-supply and learned that she had renewed a prescription for **liquor epispasticus** at intervals for 20 years.

¹ Laryngoscope, Apr., 1898.

² N. Y. Med. Rec., Feb. 16, 1898.

³ Phila. Med. Jour., Apr. 2, 1898.

⁴ Lettsomian Lectures, 1897.

⁵ Laryngoscope, June, 1898.

⁶ Medicine, Jan., 1898.

⁷ Jour. Larynx, Rhinol., and Otol., Feb., 1898.

Bacteriologic Diagnosis of Diseases of the Throat.—Edward K. Root,¹ from a study of cases reported to the Hartford Board of Health for 3 years, concludes that bacteriologic examination is essential both for treatment and prognosis. In pure culture of Klebs-Löffler bacillus the dangers are: 1. Laryngeal stenosis and death from suffocation. 2. Toxemia. Fever and complications of distant organs are of less importance. The Klebs-Löffler bacillus and staphylococcus cause a more abrupt attack, with chill or chilliness, followed by much higher temperature. The discharge is more abundant; often purulent. In pure staphylococcus-infection there is chill, followed by a temperature of 103° F. or over, painful throat, and thin exudate. In children it is often early fatal from closure of the glottis. Paralysis did not occur nor was prostration severe. There is no specific, though sodium salicylate often arrests the attacks that commence on the tonsil. [It is claimed that sodium salicylate aborts tonsillitis; but it is doubtful whether it will often do so.] The Klebs-Löffler bacillus and streptococcus

Ulceration of the Pharynx.

SYPHILIS.	CARCINOMA.	TUBERCULOSIS.	LUPUS.
Pain usually slight.	Pain lancinating, severe, constant, and often excruciating; in many cases referred to ear.	Pain severe, not constant, aggravated by efforts at deglutition or clearing the throat of inspissated mucus; sometimes referred to ear.	Pain slight, if any.
Ulcer clear-cut and punched out. Destruction of tissue great. Appears very early in the course of disease—within 2 or 3 weeks.	No clear-cut ulcer. The normal tissue is replaced by morbid growth; ulceration does not occur for 2 or 3 months after the appearance of growth.	Ulcer shallow and not clear-cut, shading imperceptibly into the normal tissue; ulceration occurs very early.	Ulceration rarely seen, the process rather being presumed by the absorption of tissue.
A profuse purulent discharge and necrosed tissue cover the surface of ulcer.	Very little discharge covers the growth; when ulceration occurs the surface is covered by a thin, sanious discharge.	The surface of the ulcer is covered by mucopurulent secretion and agglutinated mucus.	Little or no secretion.
The borders of ulcer indurated and hyperemic.	The growth is of stony hardness; an areola surrounds the growth; but no induration until the parts are encroached upon by the growth itself.	There is no areola or induration.	Disease consists of a series of indurated nodules.
Ulcer rapidly destructive and extends deeply.	Quite rapid in its course; extends in all directions.	Erodes slowly and laterally—not deeply.	Exceedingly slow in course.
Ulcer confines itself to pharynx; rarely extends to nasopharynx; never to larynx.	No anatomic boundaries confine the growth; extends in all directions and attacks all tissues.	Confines itself to mucous membrane of pharynx; extends laterally.	May extend to larynx.
Cicatrices often present. General condition unimpaired.	No cicatrices. Early in the course of the disease the general condition is good; later, however, the health fails rapidly.	No cicatrices. General condition poor from the outset, indicating some grave constitutional disease.	Cicatrices numerous. General condition very slowly impaired.
Often evidences of specific disease in other organs.	No manifestation of previous disease.	Pulmonary and laryngeal manifestations.	Cutaneous manifestation previous to and coincident with the pharyngeal.
No fever. Rapidly improves under the iodids.	No fever. The disease is uninfluenced by iodids.	High fever. Is not influenced by iodids.	No fever. Not influenced.
Sputum contains no characteristic morbid product.	Examination of sputum negative.	Tubercle-bacilli found in sputum.	Examination of sputum negative.
Microscopic examination of excised piece reveals large numbers of small round cells.	Microscopic examination of growth shows the characteristic cells of the various forms of carcinoma.	Microscopic examination shows the giant cell, tubercle-bacilli, and other evidences of tuberculosis.	Microscopic examination very similar to that of tuberculosis.

¹ Yale Med. Jour., May, 1898.

Ulceration of the Larynx.

SYPHILIS.	CARCINOMA.	TUBERCULOSIS.	LUPUS.
Pain usually slight.	Pain constant, lancinating.	Pain severe on deglutition.	No pain.
Attacks any portion of larynx and ulcerates rapidly.	Attacks any portion of larynx and ulcerates more slowly than syphilis.	The favorite site is in the interarytenoid space or the base of the arytenoid cartilages; ulcerates slowly.	Attacks any portion; ulcerates very slowly.
Is rarely seen in the stage of induration, the first evidence being a clear-cut, deep ulcer.	The first appearance is that of a new growth occupying the laryngeal cavity; no clear-cut ulcer.	Usually the first appearance is small spots of induration, which is rapidly followed by great edema.	Nodular masses.
Some induration around the ulcer, but usually very little edema.	The growth fills or encroaches on the laryngeal cavity.	Great edema of arytenoids.	Little or no edema.
Ulcer extends deeply, often involving cartilage.	Growth extends in all directions, involving all tissues in its course.	Ulcer extends laterally, but not deeply.	Very slow in progress; ulcer rarely observed.
Surface of ulcer covered by mucopurulent secretion and necrosed tissue.	Surface of growth covered by discharge.	Surface of ulcer covered by thick mucopurulent secretion and agglutinated mucus.	Little or no discharge.
Mucous membrane hyperemic and injected.	Mucous membrane hyperemic.	Mucous membrane pale.	Mucous membrane injected.
Laryngeal stenosis not common until cicatrization occurs.	Laryngeal stenosis quite common.	Laryngeal stenosis rarely occurs.	Slight stenosis.
General health unimpaired.	Early in disease no impairment of general health; later a marked cachexia.	Health impaired previous to laryngeal involvement.	Very slight impairment of general health.
Frequently evidences of syphilitic disease in other tissues.	In primary laryngeal carcinoma no other involvement until later in the disease.	Previous and coincident pulmonary trouble common.	Frequently cutaneous manifestations.
Rapidly improves under the iodids.	Iodids have no influence on the course of the disease.	Iodids have no influence.	Iodids have no influence.

cause chill, temperature of 102° F. or over, marked prostration, headache, and glandular enlargement. The membrane forms slowly, but there is much mucous secretion and the throat is painful. Pure streptococcus-infection causes glandular enlargement, beginning with the glands at the angle of the jaw, then the submaxillary, and then those of the triangles of the neck. The glands may suppurate, causing septiceemia. A typical infection by the bacterium may be seen in scarlatinal tonsillitis. The symptoms subside in 4 or 5 days unless the glands are severely affected. No paralysis occurred among these cases. Antistreptococcus-serum is not yet available.

Gottlieb Kicer¹ describes 3 cases of acute **primary miliary tuberculosis of the pharynx**. One case followed immediately a double pneumonia in a child aged 6. Two other cases developed in adults with tuberculous family history, one being infected from nursing a son who died of laryngeal tuberculosis. Kicer finds the pharynx less often involved in primary tuberculosis than the larynx, but more frequently than the esophagus. Severe pain on deglutition is the first important symptom. When the soft palate is infiltrated regurgitation of food through the nose occurs. Prognosis is absolutely unfavorable. The 3 cases lived 4, 5, and 6 months. Treatment is directed to maintain the strength and ease the pain on swallowing. Operative interference and applications of lactic acid only add to the patient's suffering. [One is led to suspect that the first case was a tuberculous pneumonia, on account of the great rarity of primary tuberculous pharyngitis.]

Wilson Prevost² found not only the *Leptothrix buccalis*, but also the *Oidium albicans* and the *Aspergillus fumigatus* in **mycotic patches**. Jonathan Wright³ notes the almost constant presence in the mouth of the

¹ Laryngoscope, Feb., 1898.² N. Y. Med. Jour., Mar. 5, 1898.³ Laryngoscope, Apr., 1898.

spores and even mycelial threads of the leptothrix. Under the microscope the mycelium can be seen in the crypts of the lymphoid tissue. Treatment includes putting the teeth in order, destroying excessive lymphoid tissue, and removing the patient to a different climate or locality. The larger masses may be destroyed; but it is impossible to reach all the ramifications by any form of application. [We have found no difficulty in destroying all macroscopic appearance of mycosis, and see no reason for removal to a different climate on account of a microscopic growth that causes no discomfort.]

Lymphadenitis Treated Through the Tonsils.—J. L. Goodale,¹ from experiments formerly reported, concludes: 1. Absorption takes place normally through the mucous membrane of the tonsillar crypts. 2. The path of the absorbed substances is in the interfollicular lymph-channels, in the direction of the larger fibrous trabeculae at the base of the organ. 3. During the process of absorption foreign substances encounter phagocytic action on the part of the polynuclear leukocytes situated in and adjoining the mucous membrane. 4. Bacteria are normally present in the crypts, but are not usually demonstrable in the tonsillar tissue proper. 5. In view of the preceding fact the supposition appears possible that bacteria may be continually making their way into the tonsillar tissue, but at the moment of entering encounter conditions which terminate their existence. Acting on these facts, he treated a number of cases of chronic angular lymphadenitis by injection of a few drops of 10% iodine into each tonsillar crypt. Marked diminution of the lymphatic gland resulted in most cases after several treatments.

Tonsillitis and Pericarditis.—W. Campbell McDonnell² reports a case of mild tonsillitis in a child aged 6½ years, followed on the third day by pericardial friction-sounds that persisted for 3 months. There was no articular involvement at any time.

Latent Tuberculosis of the Tonsil.—Hugh Walsham³ found the tonsils more or less tuberculous in 20 out of 34 consecutive postmortems. In none of the cases was there evident disease of the tonsils; most of them were atrophied. From these and other facts noted clinically he reached the following conclusions: 1. That the tonsils, instead of being almost immune from tuberculous disease, are very frequently affected. 2. That tubercle may be primary in the tonsil. 3. That the tonsils are very frequently affected secondarily in persons suffering from chronic pulmonary tuberculosis. 4. That when the tonsils are tuberculous the cervical glands receiving the lymphatics from these organs are also frequently affected with tubercle. 5. That the follicular glands at the base of the tongue are rarely found tuberculous. 6. That the tonsils may be affected from without or through the blood-stream in acute miliary tuberculosis. [We do not think the profession should accept his conclusion as to the frequency of tuberculosis of the tonsils without more extended observation.]

Syphilis of the Tonsil.—D. Bryson Delavan⁴ describes a case of ulcer of the tonsil with everted edges and induration resembling sarcoma. On microscopic examination Hodenpyl found an unusual number of endothelial cells with connective-tissue and giant cells. His diagnosis of syphilis was confirmed by the result of treatment.

Carcinoma of the Tonsil and Palate.—Edward H. Lee⁵ describes an operation involving ligation of the external carotid, removal of the submaxillary glands, inferior tracheotomy, and use of Trendelenburg's tampon trachea-

¹ Boston M. and S. Jour., May 19, 1898.

³ Lancet, June 18, 1898.

² Brit. Med. Jour., Oct. 23, 1897.

⁴ N. Y. Med. Jour., Dec. 4, 1897.

⁵ Medicine, Feb., 1898.

tube, temporary resection of the lower maxilla, and excision of the tumor *in toto*. Hemorrhage was controlled by stitching the posterior pillar to the mucous membrane of the hard palate. The lower maxilla was united with silver wire and the external incision was closed with silkworm-gut sutures. The trachea-tube was worn 6 hours. Liquid nourishment was taken by the mouth on the third day. Severe bronchitis developed soon after the operation and lasted a week. After that the patient improved rapidly, gaining over 30 pounds in 4 months. His speech is affected, but he can be understood.

W. Scheppegegrell¹ reports great improvement in a case of carcinoma of the base of the tongue from the use of **zinc electrolysis**. He also quotes Massey as curing carcinoma of the tonsil by zinc-alum amalgam cataphoresis.

Angioma of the Tonsil.—J. H. Hartman,² in Mar., 1893, removed an angioma from the tonsil of a man 32 years of age. The operation was done with the cold snare, nearly an hour being taken to avoid hemorrhage. Twenty-four hours later, however, severe hemorrhage occurred, which was controlled by the galvanocautery. In Apr., 1896, he removed with a hot snare, without hemorrhage, a small amount of tissue that had recurred. [We find the hot snare preferable for the removal of such vascular growths, as hemorrhage is far less liable to follow.]

Papilloma of the Tonsil.—Macleod Yearsley³ concludes that true papilloma of the tonsil is uncommon, while other benign growths are comparatively frequent, and the latter are often of inflammatory origin and are connected with enlarged tonsils. The growths correspond in structure with a hypertrophied tonsil, but are peculiar in projecting beyond the surface of the tonsil. They grow from the floor of a follicle or from the supratonsillar fossa. The true papilloma grows from the surface of the tonsil.

Tonsillotomy.—Arthur Ames Bliss⁴ describes 3 varieties of tonsil in which removal is indicated: 1. The simply hypertrophied tonsil, prominent, nonadherent, soft, and covered with normal mucous membrane. 2. Hypertrophy due to inflammatory action. This form is usually crossed by bands of connective tissue, forming a hard rubber-like capsule and adherent to the anterior pillar; if abscesses have occurred, the tonsil is irregular and the crypts liable to contain cholesteatomatous material. 3. The hard, nodular, sclerosed tonsil. This form is often apparently rotated backward. This readily takes on inflammatory action and is apt to maintain a condition of irritation in the fauces and larynx. The writer points out the limitation of the tonsillotome, and recommends grasping the tonsil with Farnham's crocodile-forceps and cutting it away with angular scissors. To children he gives ether, having an assistant hold the child in a sitting position to allow the blood to escape from the mouth. [The recumbent position is much safer when under ether, and with the patient lying on his side with head held over the edge of the table the blood runs out of the mouth. By operating with a snare bleeding is moderate.]

Joseph F. Gibb⁵ prefers the galvanocautery for excision of the tonsil in adults and in children when it is impossible to separate the adherent anterior pillar. In the latter case the hot snare cuts through the tonsil and pillar safely and effectively. In some cases he finds that the wound is quite a formidable-looking affair. [We have never observed an adhesion of the anterior pillar that could not be separated by means of the curved palate-retractor and the finger. The galvanocautery-snare is very liable to produce extensive cic-

¹ Jour. Laryn., Rhinol., and Otol., Feb. 18, 1898. ² N. Y. Med. Jour., Dec. 25, 1897.

³ Laryngoscope, Aug., 1898.

⁴ Jour. Am. Med. Assoc., Mar. 12, 1898.

⁵ Ann. of Surg., July, 1897.

tricial tissue, and its use should be restricted to cases in which milder measures are clearly impracticable.] J. W. Gleitsmann¹ devised a tonsil punch-forceps (Fig. 83) on the plan of Ruault's, but cutting on a horizontal plane.

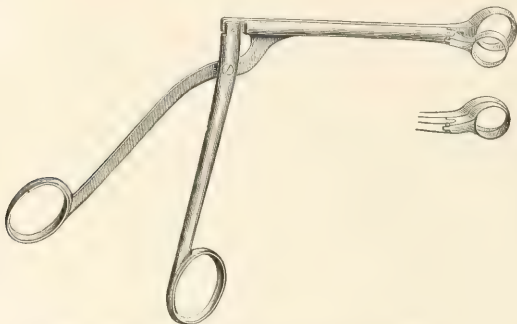


FIG. 83.—Tonsil punch-forceps (J. W. Gleitsmann, in N. Y. Med. Jour.).

The Supratonsillar Fossa.—Donald Rose Paterson² points out the common fallacy in considering the supratonsillar fossa as simply an enlarged crypt. In 1885 he described the space as occurring above the tonsil and covered by a triangular extension of membrane from the anterior pillar. It



FIG. 84.—Diagrams to show variations in plica (D. R. Paterson, in Jour. of Laryn., Rhinol., and Otol.).

is a fetal development, and persists in some cases through childhood and even to adult life. The writer thinks palatal recess a more accurate designation. Upon the variations in shape and size of the plica and upon the development of lymphoid tissue depend the outlet and capacity of the fossa. The lymphoid tissue is here disposed in a loose, open network resembling the columnæ carneæ of the heart.³ The crypts and the lacunæ are large and communicate freely with each other. From this arrangement comes the liability to the formation of foul caseous plugs and tonsilloliths in the fossa. The extent of the cavity into the soft palate varies considerably. It may extend nearly through to the nasopharynx and have offshoots extending between the muscular layers. Repeated inflammations of the fossa leave the opening still narrower, due to contraction and thickening of the plica. This, in turn, causes atrophy of the glandular elements. Peritonsillitis results from infection through the fossa, as also septic pharyngitis and phlegmonous inflammation of the deep connec-

¹ N. Y. Med. Jour., Sept. 4, 1897.

² Jour. Laryn., Rhinol., and Otol., Apr. 18, 1898.

³ Laryngoscope, 1898.

tive tissue of the neck. In a tuberculous case he found postmortem a tuberculous nodule growing from the floor of the fossa. Giant-cell systems extended deeply into the tonsil. It was probably due to autoinfection from the pulmonary disease. Attention is called to the importance of dissecting out this tissue in tonsillotomy to remove the cause of frequent trouble. [His suggestions seem to be based more on theory than on clinical observation.]

Retropharyngeal Abscess.—Oppenheimer¹ discusses 48 cases as to the etiology, which he ascribes to inflammation of the lymphatic glands of the neck caused by conditions of the mouth, nose, pharynx, or ear. In some cases the suppuration may be due to direct entry of bacteria through the mucous membrane of the pharynx. He relates 3 cases probably due to tubercle. Half the cases occurred in infants less than 1 year old.

Fracture of Nasal Bones.—Frédéric C. Cobb² describes an apparatus for holding the nasal bone in the median line during union following fracture (Fig. 85). An impression for the steel band that passes around



FIG. 85.—Apparatus for holding nasal bone in median line (Cobb, in Jour. Am. Med. Assoc.).

the head can be taken from a firm plaster bandage. The steel spring and pad can be regulated to give the necessary pressure in the proper direction. If the bones are depressed, they should be raised by an antiseptic tampon.

Acute Coryza.—Courtaud³ considers an alkaline nasal douche, at a temperature of 120° F., to be the best method of aborting coryza. Internally he gives 5 gr. each of phenacetin and Dover's powder, followed by a hot bath for 10 minutes. The powders are repeated in half an hour. After perspiring one hour the patient is rubbed dry and put to bed till morning. [It seems doubtful how much benefit is derived from the local application, when the general treatment is so well known to be efficient.]

¹ Jour. Laryn., Rhinol., and Otol., Sept., 1897, quoted from Arch. f. Kinderh.

² Jour. Am. Med. Assoc., Mar. 12, 1898.

³ Albany Med. Ann., Mar., 1898.

Atropin-rhinitis.—Lewis A. Somers¹ describes a case of rhinitis following the instillation of atropin solution, 4 gr. to the ounce, in the eyes of a 11-year-old girl. The evening following the application emesis without nausea occurred, and a free watery discharge with masses of thick mucus began the next day. These symptoms continued 3 weeks, when examination showed pale sodden turbinates, boggy to the probe, with free serous discharge which irritated the upper lip. A mild alkaline wash, followed by mentholated alboline, 2 gr. to the ounce, the irritated areas being covered with an ointment of yellow oxid of mercury, 2 gr. to the ounce of lanolin, was followed by recovery in a few days. When atropin is used for several days in applications to the eyes the nares assume a condition closely resembling hay-fever without the sneezing.

M. Lichtwitz² reports a case of paroxysmal sneezing with hydrorrhea of 6 years' duration cured by a single insufflation of **orthoform**. At least the attack had not recurred for 3 months following the application. Henry L. Swain³ recommends the local use of aqueous extract of **suprarenal glands** in certain chronic conditions of the hay-fever type as a powerful local vaso-constrictor and contractor of erectile tissue. The local effect can apparently be obtained any number of times without entailing a vicious habit. [We have obtained much relief in these cases by the use of an extract of suprarenal capsule prepared as follows: Adrenals (Armour's), 5j; acid. boric., gr. xvj; aquæ cinnamomi, ʒiv; aquæ camphor. (hot), ʒij; aquæ dest. (hot), q. s. ad ʒij; M. Macerate for 4 hours; then filter. Sig. Use as a spray to nose 4 or 5 times a day. This solution remains stable for several weeks.]

Of the **local causes of nasal catarrh**, Fayette C. Ewing⁴ says nasal obstruction means nasal catarrh, it may not be to-day, but must be to-morrow. Of diathesis, he says some are born with it and some achieve it; but however it may be acquired, it is not to be eliminated in a week nor a month by any hocus-pocus of medication nor antagonism of drugs. If the local disease is the result of obstruction, remove it; if the effect of faulty bodily habit, regulate life; if a simple manifestation of physical depravity, eliminate the dyscrasia.

Hypnotism in Intumescent Rhinitis.—Toptas⁵ cured a case of marked intumescent rhinitis in a girl, 19 years of age, by hypnotic suggestion. He also cured her of chronic constipation by the same means.

Nasal Obstruction.—C. C. Rice⁶ urges care in the choice of operations for relieving obstruction of the nares. When there is apparent anterior hypertrophy of the turbinates it may only be proportionate to the nasal opening. Part of the enlargement may be caused by reflex from obstruction of the opposite naris. The idea that the septum rather than the turbinate should be subjected to operative interference when the septum is irregular is maintained by A. Coolidge.⁷ A twisted septum may be considered pathologic, but an adjustment of the turbinates to that twisting should not be called hypertrophic or atrophic rhinitis (Fig. 86). Disease is present when that adjustment does not take place. In straightening a bent septum it may be brought into contact with the turbinates that occupied its concavity; but nature will bring about readjustment, as he has seen in a few cases, though it may be necessary to reduce the turbinate. [We acquiesce in the general statement; but the bent septum or spur should not be operated upon unless it causes ob-

¹ Laryngoscope, Oct., 1897.

² Med. Rec., June 4, 1898.

³ Rev. hebdom. de Larynx., Jan. 29, 1898.

⁴ Jour. Larynx., Rhinol., and Otol., May, 1898.

⁵ Laryngoscope, Nov., 1897.

⁶ Post-Graduate, May, 1898.

⁷ Boston M. and S. Jour., June 9, 1898.

struction. A comparatively simple cauterization of the swollen turbinate will often obviate the need of a more formidable operation.] Phillip F. Barbour¹ saw a case of nasal obstruction due to enlarged turbinates in a boy, aged 11 years, who presented the typical symptoms of adenoids: A thick nose, narrowed through the nares; an extremely highly arched palate; and front teeth bunched together, as from obstructed breathing. He was at times apparently deaf and stupid. On examination the nasopharynx was found perfectly clear. Rapid improvement physically and mentally followed reduction of the en-



FIG. 86.—Reflex spasm of the glottis caused by a large hypertrophy of the lingual tonsil (C. C. Rice, in *Post-Graduate*, May, 1898).

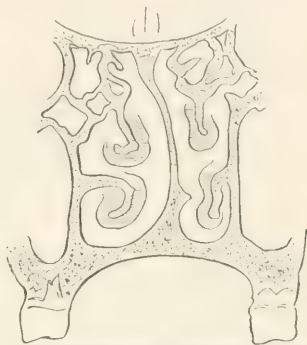


FIG. 87.—Deviation of the septum and adjustment of the turbinated bodies (A. Coolidge, in *Boston M. and S. Jour.*).

larged turbinates. [We have recently seen a similar case in a girl aged 11 years. While these symptoms, to a limited degree, are common enough in hypertrophy, it is seldom that they become so marked.]

Hypertrophy of the Turbinate.—R. Lake² advocates the removal of the anterior end of the inferior turbinate, under cocaine, with strong artery-forceps, punch-forceps, scissors, or a snare in preference to turbinectomy. Dundas Grant³ also advocates anterior turbinotomy. He makes an oblique incision with strong scissors upward and backward along the attachment of the turbinate, and removes the peninsula thus formed by means of the cold snare. J. L. Goodale⁴ devised a delicate cutting-forceps on the principle of a punch controlled by a sliding-bar. The anterior end of the middle turbinate is readily reduced by this instrument.



FIG. 88.—A new cutting-forceps (J. L. Goodale, in *Boston M. and S. Jour.*).

John C. Lester⁵ illustrates a modification of Weir's forceps for removing small polypi and parts of the middle turbinate.

¹ *Arch. of Pediatrics*, Mar., 1898.

² *Jour. Laryn., Rhinol., and Otol.*, Jan., 1898.

³ *Ibid.*

⁴ *Boston M. and S. Jour.*, Oct. 7, 1897.

⁵ *N. Y. Med. Jour.*, Oct. 9, 1897.

Greville Macdonald¹ condemns total ablation of the turbinate, and thus voices the consensus of opinion of the British Medical Association. [From our experience we would strongly urge laryngologists to adopt the conservative methods advocated by the majority of the Association.] The importance of **antiseptic** precaution during and following intranasal operations is emphasized by H. V. Würdemann,² who was compelled to drain all the accessory

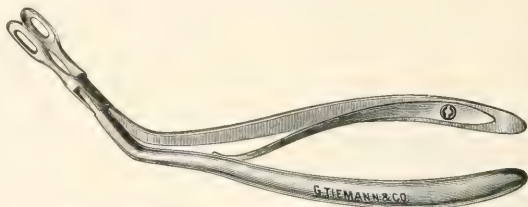


FIG. 89.—A nasal cutting-forceps (John C. Lester, in N. Y. Med. Jour.).

sinuses and open an orbital abscess on account of extensive suppuration following removal of the inferior turbinate. Charles H. Baker³ recommends relief from stenosis by cutting out one or more cores beneath the mucous membrane of the turbinate with the trephine. The membrane is pressed into the groove made by the trephine and is held there for a few hours by a packing of gauze in narrow strips. Preservation of the mucous membrane, rapid healing, and permanence of the cure are the claims put forth for this operation. [This is an excellent operation when the hypertrophy is such that the swelling does not yield readily to linear cauterization, but is not adapted to the intumescent form of the disease.] Francis R. Packard⁴ describes a case of **amaurosis** occurring in a man, aged 36 years, the day following removal of a small piece of tissue by the snare from the anterior extremity of the middle turbinate. The disturbance of vision lasted only a few minutes. Examination failed to determine anything abnormal either in the wound or in the eye. In other cases quoted dimness of vision was associated with hyperemia of the papilla and marked venous pulsation. [The difficulty of vision was apparently due to psychic disturbance.]

Nasal Synechia.—W. Scheppegrell⁵ cuts through synechiæ with a snare as follows: A celluloid sound of the smallest diameter, such as is used with a catheter for the Eustachian tube, is bent to an acute angle $1\frac{1}{2}$ in. from the end, or at other lengths, depending upon the location and size of the synechia. Although bent at this angle, the sound retains considerable resiliency, and if it be now passed into the nostril below the synechia it is compressed in its passage, but promptly resumes its original position as soon as it passes the adhering membrane. The sound is now gently withdrawn, and the end will appear in the nostril above the synechia. This end is then drawn forward by means of an alligator-forceps, and a fine silk cord, which is tied to the end of the probe, is thus drawn around the synechia. A piece of steel piano-wire, such as is used for the cold snare, is then drawn by means of this cord around the synechia, the wire being bent to an acute angle where it is attached to the silk, so as to prevent laceration of the tissues in its passage

¹ N. Y. Med. Jour., Oct. 9, 1897.

² Ibid., Nov., 1897.

³ Ann. Otol., Rhinol., and Larynx, Aug., 1897.

⁴ Med. News, Oct. 9, 1897.

⁵ Laryngoscope, Jan., 1898.

through the nostril. This wire is then attached to any of the cold snares in use for nasal operation, and, by gradually tightening the wire, the synechia is removed. Cocain is applied before the operation, and may also be applied during the progress of the operation, in this manner rendering it entirely painless. A small sheet of the thinnest white celluloid is then inserted into the nostril, the celluloid being cut to such a size and form that its lower edge will rest on the floor of the nostril, its upper edge reaching above the synechia, and its anterior edge very near the anterior orifice of the nose, so that, in blowing or sneezing, the celluloid will always separate the raw surfaces. The nostril requires no further treatment, all that is necessary being that the patient should use an alkaline and antiseptic nose-wash 2 or 3 times daily. After the first day the patient is unconscious of any foreign body in his nostril; the celluloid does not absorb septic material and gives rise to no irritation. The celluloid recommended is very thin and white, each of these specifications being for an object. If the celluloid is heavier, it is more difficult to apply and there is a greater tendency from its weight to fall into the nasopharynx during sleep. If the celluloid is transparent, it is difficult to locate it in the nostril to see if it is in proper position. On account of its innocuous qualities the celluloid may be left in position somewhat longer than is necessary. [It is an ingenious operation; but it appears to us much more tedious and no more effectual than snipping the adhesion with scissors.]

J. A. Ellegood¹ introduces the snare as follows: A long wire was pushed into a small catheter, the end of which had not been cut off. The catheter was introduced above the synechia and pushed onward until it appeared in the pharynx. It was then grasped by a pair of forceps and brought, with the wire, out at the mouth; then it was carried, without the wire, beneath the synechia until it again appeared in the pharynx. The end was brought sufficiently forward to allow the wire to be attached. The catheter was then withdrawn from the nose, bringing the wire on the under surface of the synechia. The superfluous wire being cut off, the ends were twisted, as in the other cases. In 10 days it had cut its way through, leaving both surfaces covered with epithelium. In all 3 cases the retraction of the tissues after operation was very marked, leaving no evidence that a synechia had ever existed. In no case did the wire appear to occasion any irritation or discomfort. The writer has for several years used strips of asbestos-paper to protect the septum. Being soft it produces no injury or discomfort, readily adapts itself to the surface against which it is applied, can be thoroughly sterilized by a flame before using, and is a nonconductor of heat.

Atrophic Rhinitis.—J. L. Goodale,² from a study of 200 cases of atrophy of the nares and pharynx, concludes that both fetid and nonfetid atrophy begin with the greatest frequency between the ages of 5 and 15; while the pure pharyngeal form is not found before 20, and occurs irregularly up to the age of 72. George L. Richards,³ after washing out crusts and debris from the nares with a weak alkaline solution by means of a syringe and cotton applicator, applies a spray of cocain and then washes out the nares by a douche containing 5 to 10 drops of a 40% solution of formaldehyd to 8 oz. of water. The crusts diminish and odor ceases under its use. John N. Mackenzie⁴ maintains the theory that in sclerosis the result of intranasal irritation the atrophy is usually preceded by a hypertrophic or congestive stage. But it is conceivable that sclerosis may occur *ab initio*, or it may originate from diseased conditions of the periosteum. The principal argument

¹ Laryngoscope, Apr., 1898.

² Jour. Am. Med. Assoc., Feb. 26, 1898.

³ Laryngoscope, May, 1898.

⁴ Jour. Laryn., Rhinol., and Otol., Oct., 1897.

in favor of preceding hypertrophy is the fact that atrophic changes are most marked in situations in which the catarrhal inflammation originally develops. Clarence C. Rice,¹ after reviewing the complicated methods of treatment recommended for atrophic rhinitis by electricity, tampons, vapors, etc., obtained the best results by daily washing and oiling the nasal membrane, with less discomfort than by other methods. The application should be weak, never strong enough to cause coryza.

Ozena.—Thomas J. Harris² concludes: 1. That there is no single constant cause for ozena; ozena is rightly to be regarded only as a symptom. 2. That a genuine atrophy, in all probability, does exist. 3. That focal disease, including especially disease of the accessory sinuses, while not the only cause, is a very important and common one. 4. As a practical conclusion for the rhinologist, each case of ozena, in addition to being treated with the proper constitutional and local measures, is to be thoroughly and repeatedly examined for evidence of such sinus-involvement. Riviere³ claimed better results from the treatment of ozena by applications of a fluid extract of the pituitary membrane of sheep, prepared as follows: The mucous membrane of the middle and lower turbinates of the sheep is macerated for 24 hours, at a temperature of 149° F., in water containing 4 parts of resorcin in 1000; the liquid is then filtered and subjected to the same degree of heat for 24 hours more. This preparation was also used to advantage in cases of rhinitis sicca and rebellious syphilitic disease of the nose.

Nasal Hydrorrhea.—Creswell Baber⁴ describes a case of constant watery discharge from one nostril lasting for 5 years, in a lady aged 42. The discharge had stopped for some time following removal of a polypus, but returned after an attack of influenza in 1896. On examination no polypus was found; only a naris narrowed by deflection of the septum. On one occasion he collected 70 c.c. of the fluid in 5 minutes. Treatment by spray of spirit and cocain was ineffective. Five minutes' daily use of the constant current externally, with a spray of menthol (20%) in parolein twice a day, checked the secretion gradually, and after 10 weeks' treatment the discharge ceased. From the absence of head-symptoms he concludes that the fluid was simply an excessive nasal secretion, not cerebrospinal fluid.

Epistaxis.—E. B. Gleason⁵ developed a method of controlling epistaxis from the idea of D. Hayes Agnew, who used ham-fat for the same purpose. The writer uses absorbent cotton saturated with oil as more cleanly and convenient. Another method that succeeded in a case of hemophilia as well as in postoperative hemorrhage consisted in packing the naris with cotton dripping with a 15 volume solution of hydrogen peroxid. If bleeding has been severe the packing should remain 24 hours. To prevent oozing the front of the packing can be touched with iron persulphate, either dry or in solution. A few coats will form an impervious layer. J. M. Crawford⁶ uses a tampon of sterilized nonabsorbent cotton saturated with cosmolin, albolene, or hydrogen peroxid for bleeding from invisible points in the nares. With the left index-finger passed into the nasopharynx acting as a base the tampons are packed into the naris. [The tampon we have found most satisfactory is made of a long strip of surgeons' iodoformized lint $\frac{1}{2}$ in. in width. This swells when wet with secretions and is readily removed.] Seymour Oppenheimer⁷ describes a case of hemophilia and exophthalmic goiter in a woman of 32.

¹ N. Y. Med. Jour., Nov. 20, 1897.

² Med. Rec., Oct. 9, 1897.

³ N. Y. Med. Jour., Oct. 30, 1897.

⁴ Jour. Laryn., Rhinol., and Otol., Mar., 1898.

⁵ Laryngoscope, Mar., 1898.

⁶ Ibid., June, 1898.

⁷ N. Y. Med. Jour., Dec. 4, 1897.

There was no lesion of the nares, but frequent bleeding occurred from the membrane of the middle and inferior turbinates, particularly from the areas most covered with cavernous tissue. Upon puncturing the skin of the finger with a fine needle bleeding continued several hours. The epistaxis alternated with purpura, and at times one or the other would replace the menses. Treatment consisted in reducing the fluid ingested and enjoining quiet, though rest in bed was not practicable. The epistaxis was controlled by cotton plugs saturated with either tannic acid in glycerin or a saturated solution of antipyrin. Internally tincture of belladonna was gradually increased to 25 minims a day. Inunctions of mercury biniodid were given. In 3 months the hemorrhages ceased; and in 4 months the thyroid was nearly normal. J. Baxter Mathews¹ relates a case of fatal epistaxis that developed in a young man convalescent from bilious fever. W. K. Simpson² demonstrated the use of Bernay's sponge for epistaxis. It consists of a disk $\frac{1}{16}$ in. in thickness, composed of cotton fibers subjected to great pressure. It is cut into semicircular form and introduced into the naris with the convex side upward. Covered with gutta-percha, they may be used to prevent adhesion after operations. Although capable of swelling to 15 times its thickness and absorbing 12 times its weight of fluid, it is claimed to be a comfortable dressing.

Foreign Bodies in the Nose.—S. W. Carruthers³ removed from the middle meatus a stone that the patient had carried in the nares 23 years. Polypi had been removed by different surgeons without discovering the stone. The stone was large and nodular, but had no calcareous covering. Owing to its position it did not cause great obstruction to breathing. J. F. Hill⁴ removed with a lithotrite, under ether, a rhinolith that weighed over 275 gr., which had been the cause of a so-called incurable catarrh for 25 years. The tinnitus, deafness, epistaxis, severe headaches, and other symptoms were promptly relieved. Even the septum, deflected so long by the pressure of the mass, straightened itself after a few weeks. J. A. Pratt⁵ removed half a plum-seed from the naris of an 8-year-old girl. The history of the case showed that it had been introduced 5 years before.

Syphilis of the Nose.—St. Clair Thomson⁶ recommends inunctions of mercury for the tertiary syphilitic affections of the nose and throat. In these cases he notes the frequent inefficacy of mercury and iodid internally, as evidenced by extensive destruction of tissue, with contracture and deformity. Under inunction he claims never to have had a collapse of the nose, even when the case did not come under treatment in time to prevent loss of a large part of the septum. When the gums are healthy as many as 30 or 40 consecutive nightly rubbings of a dram of blue ointment may be taken, followed by a full warm bath. A fresh supply of ointment should be prepared each week. [We would attribute the absence of deformity to good fortune rather than to the treatment. We have had the best results from the internal use of iodids with the local use of pure tincture of iodine repeatedly applied at daily sittings, or solution of copper sulphate, gr. 10 to 20 to the ounce.] G. L. Richards⁷ reports a case of syphilis of the ethmoid, with intense headache, of 3 months' duration, in a man aged 33 years. Discovering dead bone in the ethmoid cells he curetted them under cocain, with much relief. Symptoms of cerebral pressure supervened. Under ether all dead bone in the right naris and anterior ethmoidal cells was removed and the upper meatus was

¹ N. Y. Med. Jour., Apr. 2, 1898.

² Brit. Med. Jour., Feb. 12, 1898.

³ Ibid., Aug., 1898.

⁴ Med. Rec., June 4, 1898.

⁵ Laryngoscope, July, 1898.

⁶ Ibid., Jan., 1898.

⁷ Ibid., May, 1898.

thoroughly curetted. The headache was relieved in a few hours and ceased in a day or two. Under constitutional treatment there was no return of the symptoms 2½ years later.

Deviations of the Septum.—Emil Mayer¹ tabulates 200 Asch operations performed at the Manhattan Eye and Ear Hospital and at the New York Eye and Ear Infirmary since 1888. He commends the operation on account of its simplicity and for the permanence of relief secured. The oper-



FIG. 90.—Gouge (Emil Mayer, in Med. Rec.).



FIG. 91.—Elevator (Emil Mayer, in Med. Rec.).

ation is done under ether or chloroform, with the patient recumbent and the head drawn well backward. Direct or artificial light may be used. Adhesions to the turbinate are cut through by either the dull or sharp separator (Figs. 90 and 91). Hemorrhage is checked by the iced spray or cotton applicator. The open scissors (Fig. 92) are now introduced parallel to the floor of the nose, the

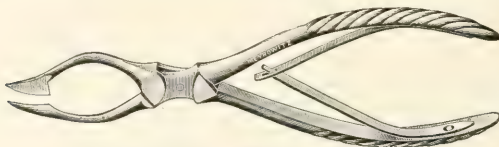


FIG. 92.—Straight scissors (Emil Mayer, in Med. Rec.).

blade in the concavity, the blunt edge over the point of greatest convexity. They are then firmly closed, the blade cutting through the cartilage into the opposite side with a distinct snap. The scissors are withdrawn and again introduced as nearly as possible at a right angle to the first incision and crossing near its center. The intersecting incision is then made and the instrument withdrawn. The finger is then introduced into the obstructed side and the 4 segments of cartilage are broken at their bases by forcing them into the concavity. The powerful compression-forceps (Fig. 93) are then introduced and



FIG. 93.—Compression-forceps (Emil Mayer, in Med. Rec.).

the septum is straightened, forcing the segments to override each other. An iced antiseptic solution is sprayed into the nostrils. A snugly fitting sterilized vulcanite tube (Figs. 94 and 95) is then introduced into the stenosed side, and a smaller one into the opposite side. This is usually sufficient to control hemorrhage. The patient is placed in bed, cold sprays are used half-hourly, and

¹ Med. Rec., Feb. 5, 1898.

iced cloths are applied externally. The tube in the concave side is only worn 24 hours, the other about 5 weeks, with frequent removal for cleansing. It occasionally happens that the lower segment remains thickened and presents



FIG. 94.—Asch's hollow splint (Emil Mayer, in Med. Rec.).



FIG. 95.—Mayer's hollow splint (Emil Mayer, in Med. Rec.).

the appearance of a spur. It can be removed by the electric trephine or by the galvanocautery. After the first 3 days the patient can attend to business as usual. For deviations close to the floor of the nose the angular scissors (Fig. 96) are sometimes necessary. [We have never been able to break the

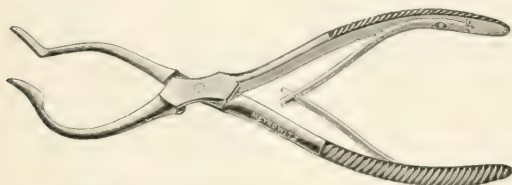


FIG. 96.—Angular scissors (Emil Mayer, in Med. Rec.).

cartilage, no matter how much pressure may be put upon it; though it can easily be bent into the opposite cavity. It will spring back as surely as would rubber unless held for a long time by a splint until union has taken place in the new position. Even then it will commonly gradually attain its abnormal position



FIG. 97.—Black's improved electromotor nasal saw; one-half actual size (G. Melville Black, in Laryngoscope).

in the course of a year.] Leonard Keplinger¹ notes the importance of saving all the mucous membrane to expedite healing after operation on the septum. After removing the excessive bone or cartilage, he stitches the flap of membrane previously dissected up with from 1 to 3 sutures. In 2 cases described the stitches were removed on the fourth day, union having taken place by first

¹ Laryngoscope, Apr., 1898.

intention. To prevent blood getting into the mouth or pharynx, he first introduces a cotton plug into the nasal cavity beyond the site of operation and then binds a towel around the head, letting it come over the mouth and up to the nose. [It is impracticable to save all or even the greater part of the mucous membrane in the great majority of cases, though it is important to save as much as possible.] Clarence C. Rice¹ insists on leaving smooth surfaces after nasal operation, to avoid foci for infection. He finds packing rarely necessary to control bleeding, but prefers filling the nostrils with compound zinc stearate and boric-acid powder, which should be used daily for a week or 10 days after operation. G. Melville Black² illustrates a new electric saw with a stroke that can be $\frac{1}{8}$ or $\frac{1}{4}$ in., as desired (Fig. 97). F. C. Cobb³ also illustrates an electric saw of simple construction that is easily controlled by a friction-clutch in the hand-piece (Fig. 98).

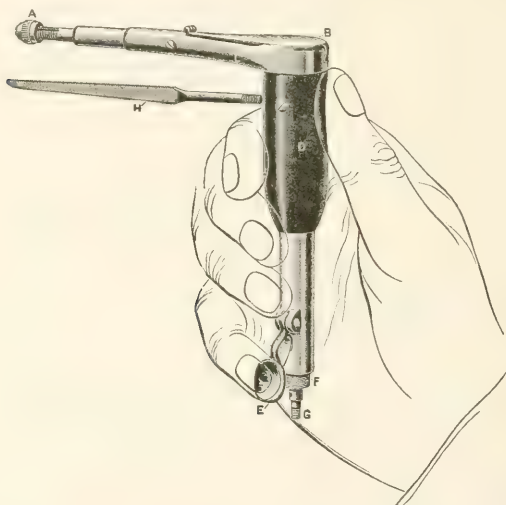


FIG. 98.—Electric saw (F. C. Cobb, in Boston M. and S. Jour.).

Tuberculosis of the Septum.—Clement F. Theisen⁴ removed with the cold snare a raspberry-like growth from the cartilaginous septum of a man aged 36 years, and destroyed the base of the growth with the electric cautery. The growth had a grayish-red surface with a small ulcer at one point. On microscopic examination it was found composed of granulation-tissue with numerous tubercle-bacilli. The patient's general health was good, and careful examination failed to reveal other evidence of tuberculosis. The writer concluded that it was a rare case of primary tuberculous ulcer. Richard Sachs⁵ removed tuberculous tumors of 4 years' growth from both sides of the septum of a patient aged 20 years. The period of development

¹ Post-Graduate, May, 1898.

² Boston M. and S. Jour., Nov. 18, 1897.

³ Münch. med. Woch., Oct. 19, 1897.

⁴ Laryngoscope, Nov., 1897.

⁵ Laryngoscope, Feb., 1898.

had been marked by frontal headache and occasional epistaxis. The lungs were normal. The operation left a perforation through the septum.

Angioma of the Septum.—William C. Glasgow¹ removed with a cold snare a smooth, round reddish tumor, the size of a hazelnut, from the lower and anterior borders of the septum of a lady 22 years of age. Almost no bleeding occurred. Five months later it had grown to almost its original size. It was again removed with a snare and the base cauterized with chloroacetic acid.

Myasis Narium.—M. A. Goldstein² was able to see a patient daily from the time a mass of eggs of the Texas screw-worm was deposited in the nose. Over 500 single eggs were removed at the first visit, and the patient used an antiseptic spray freely. Complete obstruction with intense pain rapidly developed. Larvæ were removed from time to time as they appeared. On the sixth day fluctuation was detected over the dorsum of the nose. After incision 3 worms and much pus were removed. In the 2 days following 12 worms were removed, after which the symptoms subsided. Various antiseptics were used without stupefying or killing the larvæ. [Chloroform injected has been found a very efficient application. It smarts severely at first unless the patient is partly anesthetized.] W. Scheppegrell³ suggests filling the nasal cavity with warm glymol, the patient lying on his back with the head dependent. The oil suffocates the worms by blocking up their spiracles.

Rhinitis and Conjunctivitis.—Robert N. Keely⁴ calls attention to the possibility of conjunctivitis being caused by an extension of purulent or membranous rhinitis through the nasal duct. He described 3 cases in which treatment of the nasal disease assisted in the cure of the conjunctivitis.

Nasal Neurosis.—A. C. H. Moll⁵ describes 2 cases of dysphagia due to the presence of septal spurs and promptly relieved by their removal. One was a man aged 60 years, the other a woman aged 53. Fleiss⁶ found that in some cases he could entirely relieve painful menstruation by the application of a 20% cocaine solution to the lower turbinates and the tuberculum septi.

Nasal Headache.—W. Scheppegrell⁷ saw a case of periodical agonizing headache in a sister of some holy order. The first attack began in 1885, and was relieved in 3 weeks by a severe fall upon her head, which caused a discharge of about 1 oz. of yellow watery fluid from the nose. The attacks occurred at intervals of from 1 to 2 weeks, lasted from 3 to 5 days, and were suddenly relieved by the discharge of fluid from the nose. In 1893 the writer opened the sphenoidal and frontal sinuses and the ethmoid cells and catheterized the antrum, without relief. Finally some of the fluid was secured for examination, and was found to resemble closely cerebrospinal fluid and the contents of the cranial lymphatic vessels. Upon deciding that the fluid was probably from a cerebral cyst, on account of the limited amount of fluid discharged, he declined further interference.

Nasal Cough.—Alfred C. Palmer⁸ notes the intimate connection of the nerves of the larynx and of the anterior part of the nasal cavity, first through the nasal nerve, then the ophthalmic, then through the Gasserian ganglion to the sympathetic, down this nerve to the laryngeal, on to the superior laryngeal and its terminal filaments. He suggests the possibility of galvanocautery-sears on the turbinate being a reflex cause of laryngeal irritation and cough.

¹ N. Y. Med. Jour., Jan. 8, 1893.

² Ibid., Feb., 1898.

³ Jour. Laryn., Rhinol., and Otol., Feb., 1898.

⁴ Jour. Am. Med. Assoc., Feb. 26, 1898.

⁵ Laryngoscope, Dec., 1897.

⁶ Jour. Am. Med. Assoc., Mar. 5, 1898.

⁷ Boston M. and S. Jour., Dec. 9, 1897.

⁸ Southern Med. Rec., May, 1898.

[Reflex nasal cough usually is caused by irritation of the posterior third of the turbinate or septal mucous membrane.]

Relation between the Nares and the Sexual Apparatus.—John Noland Mackenzie,¹ in one of his characteristically classical articles, points out the physiologic as well as the pathologic relationship between the nares and the sexual apparatus. Among the physiologic relations he notes: 1. In some women with healthy nares congestion of the nasal cavernous tissue occurs regularly during the menses. 2. Nasal swelling may take the place of the menses. 3. The nasal mucous membrane becomes more susceptible to reflex-producing impressions during the menses. 4. These conditions are also found during pregnancy at the period corresponding to the menses. 5. Epistaxis as a vicarious menstruation. 6. The sympathy between the erectile tissue of the generative tract and the other erectile tissues of the body. From these considerations he concludes that: 1. Pathologic processes in one set of organs may react upon the others; thus nasal affections in some women are greatly aggravated during the menstrual epoch or when under the influence of sexual excitement. 2. Nasal discharges may be offensive only during that period. 3. Coryza may be caused by excessive venery. 4. The coexistence of uterine or ovarian disease exerts sometimes an important influence on the clinical history of nasal disease. Charles Prevost Grayson² relates the case of a gay widower whose amours kept the nares in a condition of constant irritation, for which he had had all kinds of treatment, local and constitutional. A month's trial of common virtue by the patient caused the writer to laud the seventh commandment as the best prescription for these troublesome cases.

Transillumination.—L. B. Lockard³ sums up as unwarranted and dangerous the generally accepted conclusion as to the use of transillumination of the frontal and maxillary sinuses as expressed in Burnett's *System*. Unwarranted because well-known anatomic conditions preclude the possibility of accuracy; dangerous because the uncertain results obtained may lead to incorrect diagnosis and consequent uncalled-for operative procedures. Charles H. Knight⁴ believes that with ordinary care the proportion of cases in which the light may prove delusive is extremely small. An antrum filled with pus must be opaque. Almost the only chance for error is in the case of an asymmetric skull, of which the larger antrum contains a small quantity of pus. In the absence of subjective symptoms a dark antrum does not authorize a diagnosis of empyema. The evidence furnished by transillumination, therefore, must be regarded as corroborative rather than by itself conclusive. F. Fehleisen⁵ notes that in very pronounced empyema the diseased side showed darker on transillumination; but in chronic pyorrhea both sides may seem equally light. Therefore the negative result of examination proved nothing, though the positive is of some value.

Sinusitis.—Rockwell A. Coffin⁶ explores the sinuses as follows: Finding pus under the middle turbinate, he clears the naris of pus and applies cocaine. An attempt is then made to introduce a small silver cannula into the normal opening of the antrum, or, failing in that, to try the abnormal opening which, as Hajek has demonstrated, nearly always exists lower down. If this is impracticable, he makes an experimental puncture. The easiest place to do this is in the middle meatus, as the wall is mostly cartilage; but there is danger of puncturing the orbit, as represented in Fig. 99. He prefers the lower meatus as safest. Transillumination he finds of uncertain reliance. The

¹ Brit. Med. Jour., Nov. 27, 1897.

² N. Y. Med. Jour., Nov. 27, 1897.

³ Med. Rec., Aug. 7, 1897.

⁴ Jour. Am. Med. Assoc., Feb. 19, 1898.

⁵ Laryngoscope, July, 1898.

⁶ Boston M. and S. Jour., Mar. 24, 1898.

antrum is irrigated in one of the methods described. If pus escapes, it must come from the antrum. After that cavity is cleansed an attempt is made to introduce the hollow probe into the natural opening of the anterior ethmoidal cells and irrigate them. If pus still appears in the middle meatus, it must come from the frontal sinus, and an attempt should be made to irrigate it, using the hiatus semilunaris as a guide (Fig. 100, *H F*). To facilitate this procedure we may remove the anterior end of the middle turbinate by a snare or double curet. With a properly bent probe the opening can then be readily

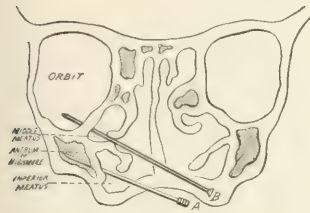


FIG. 99.—Section through the nose, showing needle (*B*) entering the orbital cavity through the middle meatus when the lateral wall slopes outward; *A* shows needle entering the antrum through the inferior meatus. Outline: Zuckerkandl, Anatomie der Nasenhöhle (R. A. Coffin, in Boston M. and S. Jour.).

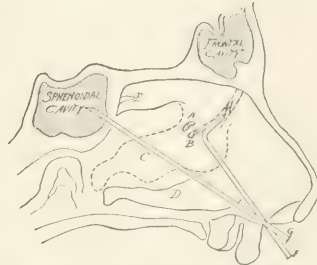


FIG. 100.—*C*, middle turbinate removed to show hiatus semilunaris, openings to antrum, and anterior ethmoidal cells; *D*, lower turbinate; *E*, position of bent probe entering hiatus semilunaris; *G*, straight puncture-needle going over middle of middle turbinate and entering sphenoidal cavity; *H*, hiatus semilunaris leading to frontal cavity. Outline: Zuckerkandl (R. A. Coffin, in Boston M. and S. Jour.).

entered and the sinus irrigated. If pus is found coming down over the middle turbinate or high up in the olfactory fossa, or following the turbinates to the nasopharynx, it indicates the involvement of the sphenoidal cavity or the posterior ethmoidal cells. It is rarely that the normal opening of the sphenoidal cavity can be seen. By directing the cannula upward and backward, using the floor of the nose anteriorly as a rest and going over the middle turbinate a little posterior to the center, one enters the normal opening of the anterior wall of the sinus (Fig. 100, *G*). After irrigating this sinus pus will still appear in the olfactory fissure if the posterior ethmoidal cells are affected.

N. Stevenson¹ describes a case of necrosis of the posterior part of the alveolar process that had been treated for 3 months as an empyema. Transillumination showed the antrum to be free. Extraction of a second molar brought away the process and a third molar, with relief of the chronic suppuration. E. W. Roughton² says that the teeth on the affected side do not give out the normal resonance when struck with a steel instrument, but sound more like the lower teeth.

Alexander Douglas³ saw a case of empyema of the antrum in a 3-weeks-old baby. There was extreme deformity of the face, with exophthalmos from pressure. Opening the cavity through the mouth externally to the alveolus and syringing with boric-acid solution effected a cure. The mother suffered from mastitis and the child had conjunctivitis, for which the nurse applied a lotion.

Operation.—N. Senn⁴ recommends temporary osteoplastic resection of

¹ Brit. Med. Jour., Feb. 26, 1898.

² Austral. Med. Gaz., Dec. 20, 1897.

³ Laryngoscope, Mar., 1898.

⁴ Pacific Med. Jour., Dec., 1897.

the anterior wall of the antrum to facilitate detection and removal of the cause of the suppuration in chronic cases that have resisted ordinary treatment. A free communication is then established between the antrum and the nasal cavity, either by dilating the normal passage or by perforating the thin wall with curved forceps. The cavity is flushed daily with a saturated solution of boric acid or Thiersch's solution, and if the discharge is fetid or profuse the irrigation is preceded by an injection of hydrogen peroxid. Nasal drainage should be continued for several weeks, long enough for the opening to become permanent and lined with mucous membrane. This treatment has given ideal results in more than 10 consecutive cases.

Congenital Occlusion of the Posterior Nares.—J. Payson Clark¹ operated on a girl, aged 18 years, with a complete wall of bone from 2 to 9 mm. in thickness closing both nares just in front of the posterior edge of the septum. She had the typical adenoid face. In infancy she could not nurse, and later she was subject to headache, syncope, and aprosexia. The chest was well developed and her general health good. Her hearing was nearly normal. The sense of smell was entirely wanting, but taste was fairly well developed. He drilled through the hard bony wall in both nares after removing a ridge from the septum, and enlarged the opening on one side to 11 by 13 mm. The opening on the other side is somewhat smaller. No trace of the sense of smell has developed, but she is less subject to headaches and does not faint.

Pharyngeal Tonsil in Adults.—H. Moulton² calls attention to the symptoms caused by a slight general thickening of the adenoid tissue in the vault of the pharynx in adults. This is described as a sensation as of a foreign body, with a tendency to hawk and clear the throat, with little relief. The appearance may be easily overlooked, but removal of the thickened tissue relieves the symptoms. [Remnants are often present in adults without symptoms.]

Etiology of Adenoids.—R. R. Stowell³ protests against the view that all cases of adenoids show some mental dulness. One of his worst cases was a boy, of unusual brightness and activity, in spite of deafness and running ears. As to mouth-breathing, he finds it nearly or quite complete during the daytime. During sleep the instinct to breathe through the natural channels strongly reasserts itself, and in spite of difficulty nasal breathing is restlessly carried on. The obstruction, however, causes noisy breathing, then snoring, then night-terrors, and later chest-deformity.

Symptoms of Adenoids.—John W. Farlow⁴ calls attention to the cases of small adenoids in children with roomy postnasal spaces, without obstruction to breathing. This tissue is subject to chronic inflammation from colds, the grippe, or contagious diseases. It may thus become a focus for severe disturbance of the health, and should be removed. On the other hand, mouth-breathing may be caused by a variety of conditions independent of the adenoid, as the common causes of nasal obstruction or too narrow nostrils. [It does not appear to us wise to remove small adenoids that cause no inconvenience because of the fear that they may cause trouble in the future. It is to be remembered that the enlarged Luschka's tonsil tends to disappear spontaneously before adolescence. Meddlesome surgery cannot be recommended.] Eustace Smith⁵ describes a case of adenoids curetted by R. P. Cockburn in a 3-months-old infant, with complete relief of **laryngeal stridor** that had been constant since birth. The stridor was a long-drawn croak, loud in

¹ Boston M. and S. Jour., Feb. 24, 1898.

² Laryngoscope, Aug., 1897.

³ Intercol. Med. Jour. of Austral., May 20, 1898.

⁴ Boston M. and S. Jour., Apr. 21, 1898.

⁵ Lancet, Mar. 19, 1898.

inspiration, but distinct on expiration. The operation also stopped the frequent suffocative attacks to which the infant was accustomed.

Adenoids and Deaf-mutism.—Ottokar Frankenberger,¹ from examination of 158 deaf-mutes between 6½ and 10 years of age, found that 59.45% had adenoids. Of the 42 cases that presented evidences of old or recent severe inflammatory disease of the middle ear, 88% had adenoids. From these facts he concludes that adenoids predispose to deaf-mutism indirectly by favoring affection of the middle ear and labyrinth, especially upon the invasion of infectious diseases. Attention given the nasopharynx in infancy is therefore of the greatest importance in the prophylaxis of deaf-mutism. Dundas Grant² thinks that the recurrence of adenoids after removal is extremely rare; but he notes the conditions which may cause persistence of the mouth-breathing. In one case he found hypertrophy of the inferior turbinate, galvanocautic treatment of which entirely relieved the adenoid symptoms. In other cases marked projection of the atlas into the pharynx caused an obstruction to breathing after adenoids were removed. [It has appeared to us that recurrence depends upon imperfect removal.]

H. Arrowsmith³ tabulated the cases of **hypertrophy of the lymphoid ring** found in 2000 children attending the clinic of Jonathan Wright, as follows: Of adenoids alone, 18.4%; adenoids and tonsils, 16.65%; tonsils alone, 5.05%; lingual tonsil, 2.8%. Two hundred and fifty-five operations were done for adenoids and 208 tonsillotomies. In no case was the slightest indication of a tuberculous tendency discovered upon gross examination, and 12 microscopic examinations were also negative.

Dangers of Operation for Adenoids.—John A. Thompson⁴ saw a nurse whose left internal carotid artery passed just beneath the mucous membrane of the pharynx behind the posterior pillar. In an operation for adenoids the artery could hardly be avoided. [We have seen several similar cases in persons of various ages.]

E. Schmiegelow⁵ reports a fatal case of curetting adenoids in a boy 12 years old. The operation was immediately followed by anterior hemorrhage, which was controlled by anterior and posterior packing. Respiration ceased and could not be reestablished. At the autopsy the right lateral wall of the nasopharynx was found lacerated. In the internal carotid was a long wound, just below the portion that enters the carotid canal of the petrous portion of the temporal bone. There were numerous enlarged glands contiguous to the artery. The cause of the rupture of the internal carotid was not apparent, but the swollen glands probably had an influence on the fatal result. Wallace Preble⁶ reports a fatal case of secondary hemorrhage, occurring on the seventh day after an operation for adenoids with the forceps, in a 11-year-old girl. The bleeding at the time of the operation was slight. It began while she was walking in sunlight. She fainted, and the bleeding ceased under cold syringing. Later in the day it began, but was controlled by plugging the posterior nares. The following morning death followed recurrence of the hemorrhage. He appends the reports of 3 French and 2 Danish cases of true secondary hemorrhage. Frank Whitehill Hinkel⁷ adds 7 cases of death due to **chloroform**, given for adenoid operation to the 11 cases previously reported since 1892. In conclusion he states: 1. Statistics show an exceptionally high mortality from chloroform-anesthesia in the opera-

¹ Jour. Otol., Rhinol., and Laryn., Nov., 1897.

² Ibid., Aug., 1897.

³ N. Y. Med. Jour., Aug. 27, 1897.

⁴ Laryngoscope, Jan., 1898.

⁵ South. Med. Rec., Feb., 1898.

⁶ Boston M. and S. Jour., May 12, 1898.

⁷ Laryngoscope, July, 1898.

tion for the removal of lymphoid hypertrophies of the pharynx. 2. The observations of the Vienna pathologists show that sufferers from "adenoids" frequently belong to an abnormal constitutional type that has been found peculiarly susceptible to chloroform-narcosis. 3. In view of the statistic and pathologic data presented, the general use of chloroform in the operation for hypertrophied tonsils or nasopharyngeal adenoids is inadmissible.

Etiology of Laryngismus Stridulus.—Alex. M. Erskine¹ contributes to the subject of the etiology of laryngismus stridulus the notes of a case in which each eruption of the milk-teeth was accompanied by these attacks. At the age of 12 months simply rubbing the gums brought on an attack, which subsided as soon as the teeth appeared.

Spasm of the Tensors of the Vocal Cords.—John Edwin Rhodes² attributes this condition, dysphonia spastica, to abnormal use of the voice. It is usually connected with some nasal affection. The voice is jerky in passing from a low to a high tone, and there is difficulty in getting started. Prognosis is very unfavorable. Long rest, with tonics, is the best treatment.

Paralysis.—Brael³ describes a case of aphonia and paralysis of the right cord following a wound about the middle of the left sternocleidomastoid. It seemed to be a traumatic neurosis. Felix Semon⁴ tabulates the known cases of laryngeal abduction-paralysis as follows, and calls attention to the importance of detecting the paralysis, which is often the earliest symptom of serious organic disease:

I. BULBAR AND BULBOSPINAL AFFECTIONS.

1. Hemorrhage and softening.
2. Syphilitic processes.
3. Tumors.
4. Diphtheria.
5. Progressive bulbar paralysis.
6. That curious form of systemic central nervous disease first described by Hughlings Jackson and Morell Mackenzie, in which one-half of the tongue, the corresponding half of the palate, the corresponding vocal cord, and, in a number of cases, the corresponding trapezius and sternomastoid muscles are affected.
7. Amyotrophic lateral sclerosis.
8. Disseminated cerebrospinal sclerosis.
9. Syringomyelia.
10. Tabes dorsalis.

II. PERIPHERAL AFFECTIONS.

1. Acute rheumatic influences.
2. Catarrhal neuritis.
3. Toxic influences (lead, arsenic, etc.).
4. Tumors in the posterior cavity of the skull or in the foramen lacerum or foramen jugulare.
5. Pachymeningitis.
6. Traumatism (unintentional ligation of nerves, injection of iodine into a goiter, cut-throat, stabbing, injury during extirpation of goiter, etc.).
7. Tumors of neck (goiter, peritracheal glands, etc.).
8. Aneurysms of the arch of the aorta, innominate, subclavian, carotid.
9. Mediastinal tumors (malignant, tuberculous, calcification of bronchial glands, etc.).
10. Pericarditis.
11. Pleurisy.
12. Tuberculosis and pleuritic thickening of apex of right lung.
13. Chronic pulmonary affections (chronic pneumonia, anthracosis, etc.).
14. Infectious fevers (typhoid, etc.).
15. Esophageal carcinoma.

Dundas Grant⁵ describes 2 cases of paralysis of the left vocal cord due to **alcoholic neuritis**. One patient, a clergyman, was in the habit of drinking a pint of stout with his meals, besides unlimited brandy while reading evenings. A few weeks' professional rest and abstinence caused a cure. In the other case, a middle-aged lady, he suspected malignant disease of the mediastinal glands on account of a previous removal of the breast for supposed malignant disease. Upon investigation he learned that she had acquired the habit of drinking large quantities of brandy for certain cardiac attacks. Limiting her stimulants was soon followed by relief of a severe cough and by restoration of the function of the vocal cords.

¹ Brit. Med. Jour., Jan. 15, 1898.

³ Jour. Laryn., Rhinol., and Otol., Feb., 1898.

² Med. Rec., June 4, 1898.

⁴ Brit. Med. Jour., Jan. 1, 1898.

⁵ Jour. Laryn., Rhinol., and Otol., Oct., 1897.

Prolapse of the Ventricle of Morgagni.—Worthington¹ describes a case in which there was edema of the epiglottis, with dyspnea and stridor. The swelling subsided, leaving a small tumor. St. Clair Thompson quoted Koschier² to the effect that there was no actual eversion of the sinus in this condition, but always solid tumors, cystic or fibromatous, taking their origin from the wall of the sinus.

E. Fletcher Ingals treated an as yet unpublished case of cyst, associated with *prolapse of the ventricle*, in a man aged 39. In 1890 an abscess developed below the angle of the jaw on the right side. Upon having it lanced pus escaped and the swelling subsided. The patient had a similar experience in 1892. In 1897 he had a swelling in the same region, apparently containing air, as it would disappear upon firm pressure. In May, 1898, he presented a swelling which caused no inconvenience except occasional slight aching. His health was excellent. His voice was a coarse whisper with a peculiar vibration, that was subsequently found to be caused by vibration of the epiglottis. There was some dyspnea upon exertion. Pressure would nearly obliterate the swelling and at the same time cause aphonia. The base of the tongue presented a bulging on the right side crowding against the epiglottis. The swelling extended downward at the right side of the larynx, causing a bulging of the ventricular band so as completely to hide the right vocal cord and ventricle upon inspiration, and to hide the left cord and part of the left side of the larynx on attempted phonation. Two ounces of thick, mucilaginous, semitransparent fluid were aspirated, when the cyst seemed to be empty. He then injected $\frac{1}{4}$ dram of equal parts of carbolic acid and glycerin, bringing the mixture into contact with every part of the cyst-wall, after which it was withdrawn. The voice was much clearer at once. The swelling at the base of the tongue disappeared, but a mass $\frac{5}{8}$ in. long by $\frac{3}{8}$ in. in diameter projected into the larynx just above the vocal cord. To relieve some edema he snipped the membrane with cutting-forceps a few hours later and had cold compresses applied during the night. The next day, after applying 10% cocain solution, he attempted to remove the mass with cutting-forceps, but only succeeded in pinching it strongly, thus slightly reducing its size. With the polypus-snare fitted with a laryngeal tube he then grasped the mass in a No. 8 wire loop and cut it off close to the surface of the larynx. Cold compresses were applied over the neck during the following night. No swelling occurred. Two days later the larynx was entirely free from obstruction. The vocal cords were moderately thickened and congested, for which the patient was directed to use a mild astringent spray twice a day.

Edema of the Larynx from Potassium Iodid.—Stankowski³ describes 2 cases of unilateral edema of the larynx due to the ingestion of potassium iodid. One case was a woman, aged 29, with pulmonary and laryngeal phthisis, with infiltration of the interarytenoid and right arytenoepiglottic folds. After 5 days' treatment with potassium iodid considerable edema developed, which disappeared when the iodid was discontinued. The other case was a man, aged 31, who was given iodid 2 weeks on account of tertiary syphilitic symptoms. Coryza and an edematous swelling of the right side of the larynx developed. There was no infiltration, and the swelling lacked the characteristics of syphilitic perichondritis. The iodid was discontinued, after which the swelling soon disappeared.

J. S. deJarnette⁴ intubated an 80-year-old patient, with edema glottidis,

¹ Jour. Laryn., Rhinol., and Otol., Feb., 1898.

² Ibid.

³ Pacific Med. Jour., July, 1897.

⁴ Va. Med. Semi-monthly, May 27, 1898.

by passing a No. 17 E. soft-rubber catheter, with the end cut off, through the nostril and into the larynx. Pneumonia developed and the patient died, though the laryngeal stenosis was relieved.

Congenital Obstruction of the Larynx.—G. A. Sutherland and H. Lambert Lack¹ made a study of 18 cases of stridor beginning at or soon after birth. As a rule, the infants were well nourished; but rickets was observed in a few cases over 3 months of age. Inspiration began with a croaking noise and ended with a high-pitched note; expiration was accompanied by a short croak when the stridor was loud, but at other times was noiseless. But many modifications of this typical case occur. The cry and cough were normal. Eight cases had suffocative attacks with marked stridor and cyanosis. Persistent cyanosis was a marked symptom of the only fatal case seen. Examination of the throat and pharynx found no obstruction of importance due to enlarged tonsils or adenoids. The epiglottis was sharply folded on itself, the 2 lateral folds being in close apposition, and in some cases in contact. The thin folds of membrane surrounding the upper aperture of the larynx flapped to and fro on respiration. In children otherwise healthy the stridor tends to increase in loudness for some weeks or months after birth; then to remain more or less stationary until the eighth or ninth month; and then gradually to diminish, until it was lost about the end of the eighteenth month or second year with the increased firmness of the tissues about the laryngeal opening. In the earlier cases drugs were used with little effect. Later, recognizing the mechanical nature of the difficulty, efforts were directed to maintain a high state of nutrition and avoid all catarrhal inflammation. The possible necessity for tracheotomy in severe cases should not be overlooked.

Felix Semon² describes a case of **congenital web** between the anterior three-quarters of the vocal cords of a girl of 16. The web was slightly reddish, thin at the free edge, but much thicker at the anterior commissure. The voice was very hoarse—almost aphonic. Inspiratory stridor was occasionally observed. The writer found it impossible to incise the membrane with any form of laryngeal knife. He then punctured the web at the anterior commissure with a pointed electrode. Later, other punctures were made until the web contracted into an uneven mass on the anterior wall of the larynx. This mass was finally removed with cutting-forceps. The voice became quite loud, though somewhat veiled, and the dyspnea disappeared.

Mycosis of the Larynx.—Price-Brown³ treated a high-school pupil with mycosis of the ventricular bands and symptoms resembling laryngopulmonary phthisis. Applications of lactic and chromic acids and silver nitrate were made without benefit. Finally the spots were touched with the galvanocautery needle. The cough ceased, the temperature fell to normal, and the voice became clear. The patient rapidly regained his normal weight.

Tuberculosis of the Larynx.—Intubation.—D. Bryson Delavan⁴ recommends intubation in advanced tuberculous disease of the larynx with contraction and severe dyspnea. He describes a case which he intubated repeatedly, with great relief for weeks at a time. He adds a *résumé* of other conditions of chronic stenosis in which intubation is indicated. James Donelan⁵ found the submucous injection of *guaiacol* into infiltrations and beneath the base of laryngeal ulcers greatly facilitated by an all-metal syringe with 3 nozzles of different lengths to reach different parts of the larynx. The

¹ Lancet, Sept. 11, 1897.

³ Canad. Pract., July, 1897.

² Brit. Med. Jour., May 28, 1898.

⁴ N. Y. Polyclinic, Mar. 15, 1898.

⁵ Lancet, Dec. 25, 1897.

needle projects $\frac{1}{2}$ in. beyond the shoulder, which depth is necessary to secure retention of the fluid. One minim of guaiacol is the amount injected, and that injection can be repeated in from 4 days to a week. He found this treatment devoid of danger, and followed by rapid healing of ulcers with relief of dysphagia.

J. W. Gleitsmann¹ considers curettage indicated: 1. In cases of primary tuberculous affections without pulmonary complications, in one of which, at least, he prevented the infection from extending to the lower air-passages and restored the patient to health after a severe and prolonged struggle, over 8 years ago. 2. In cases with circumscribed ulcerations and infiltrations of the larynx. 3. In cases with dense, hard infiltrations of the arytenoid region of the posterior wall or of the ventricular bands. In tuberculous tumors of the epiglottis. 4. In the incipient stage of pulmonary disease with but little fever and no hectic symptoms. 5. In advanced pulmonary disease with distressing dysphagia resulting from infiltration of the arytenoids, as the quickest means of giving relief. As the last indication noted may incur more opposition than the others, the writer feels constrained to state that it was always a great source of satisfaction to him when he was able to relieve a sufferer from the tortures he had to endure. In such cases he knows of no procedure which acts so rapidly and so effectually as curettage, and it is surprising how well such patients bear the operation and how quickly the wound heals, even in an advanced stage of the disease. The contraindications for curettage are: 1. Advanced pulmonary disease and hectic. 2. Disseminated tuberculosis of the larynx. 3. Extensive infiltrations, producing severe stenosis, when tracheotomy is indicated, or laryngotomy may be taken into consideration. He fully agrees with Heryng not to advise the operation in timid, distrustful patients lacking the necessary nerve-power, and, like him, prefers to operate on the patient in a hospital, where he is under absolute control and the after-treatment can be carried out more satisfactorily. The technic of the operation has been greatly facilitated by Heryng's rotary double curet.

Papilloma of the Larynx.—J. McNeill Whistler² removed a snowy-white, oblong, pedunculated growth (Fig. 101) from the border of the epiglottis. It had caused no symptoms whatever, but was discovered during the treatment of a post-nasal catarrh. Microscopic examination showed the structure to be a typical papilloma. It had not recurred within 3 months.

T. C. Railton³ describes two cures of multiple papillomata in young children by wearing soft-rubber trachea-tubes 25 and 45 months, respectively, after tracheotomy. Preston M. Hickey⁴ removed the larger masses of papilloma with the tube-forceps of McKenzie from the larynx of a boy 12 years of age. Dyspnea and cough were relieved by this procedure. To cause absorption of the small granules remaining, principally on the vocal cords, an ordinary intubation-tube was introduced. This caused so much irritation that he used instead a short or foreign-body tube, which was introduced daily for a month by aid of the mirror, and worn an hour or two. The larynx is in a healthy condition, except a slight thickening at the anterior commissure and two traces of scar-tissue.



FIG. 101.—Laryngeal growth (J. McN. Whistler, in *Jour. of Laryn., Rhinol., and Otol.*).

¹ Med. Rec., Dec. 4, 1897.

Brit. Med. Jour., Feb. 19, 1898.

² Jour. Laryn., Rhinol., and Otol., Aug., 1897.

⁴ Med. Age, Mar. 25, 1898.

J. McNeill Whistler¹ offers a laryngeal cutting-forceps with rotary end, so that it can be set to cut in any plane.

Carcinoma of the Larynx.—Diagnosis.—Chiari² concludes that the only thoroughly reliable diagnostic method is microscopic examination, in which opinion Krause³ concurs, with the additional precaution that a deep section of the growth is essential for examination. The uneven, white appearance regarded as typical of carcinoma may be merely a deposit and infiltration of fibrin. Rosenberg⁴ had a case in which 3 different diagnoses were made by competent pathologists from microscopic examination. Heryng⁵ removed 3 pieces from a tumor of the larynx, all of which were called fibroma. Upon extirpating half the larynx typical carcinoma was found.

Local Applications.—Spengler⁶ recommends *parachlorophenol* lightly painted on as an antiseptic and anesthetic in inoperable cancer.

Operation.—For intrinsic cancer without involvement of the glands Chiari⁷ had good results in 3 cases of *laryngofissure*. Krause⁸ prefers total extirpation of the larynx, which he has performed 14 times with only 1 death. He stitches the end of the trachea to the skin. B. Fränkel⁹ reports 9 intralaryngeal operations, with 5 cures. The operation is not at all dangerous, and the result is not surpassed by that of any other method, for the patient not only retains his larynx, but is able to speak in a loud, distinct voice. The intralaryngeal operation is indicated only when it is possible to remove all the disease and to reach healthy tissue. If in the course of this operation it is found that appearances have been deceptive and that it is impossible to remove the growth radically, laryngotomy must be performed. The patient must be kept under observation after undergoing the intralaryngeal operation. If there is recurrence, the prognosis is not worse than at first. The author uses chiefly cutting-forceps and curets. Excepting the galvanocautery, he regards as applicable any method whereby the tumor can be radically removed.

D. Bryson Delavan¹⁰ advises tracheotomy at least 10 days before laryngectomy. Tracheal respiration is thus established with the least disturbance of the system. Rest thus obtained has a favorable influence upon the condition of the larynx. The cicatricial adhesion between the trachea and skin is a distinct advantage in extirpating the larynx by Cohen's method. C. Fleming¹¹ relates a most impressive personal experience with carcinoma of the vocal cord. In June, 1895, his voice began to be somewhat husky or weak, as if he had laryngeal catarrh. This was absolutely the only symptom, except that the voice gradually became more muffled. In Nov., 1895, Felix Semon discovered a very small growth of indeterminate nature on the vocal cord, without surrounding inflammation or glandular involvement. In May, 1896, Semon again failed to make a diagnosis. In July, 1896, both Semon and Butlin advised operation. July 21, 1896, Semon performed tracheotomy, laryngotomy, and complete removal of the left cord, together with a certain amount of healthy tissue. Since then his voice has wonderfully improved in tone and quality, with the formation of a cicatricial ridge, as Semon expected. Shattuck's microscopic examination showed typical squamous-celled carcinoma in an early stage. Little horny transformation had taken place. No cells of the growth reached the divided edge. J. Payson Clark and Francis B. Harrington¹² report an operation by the latter for carcinoma involving the whole left vocal cord in an irregular thickening (Fig. 102). After tracheotomy the

¹ Jour. Laryn., Rhinol., and Otol., Mar., 1898.

² Ibid.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid., Nov., 1897.

⁷ Ibid.

⁸ Ibid.

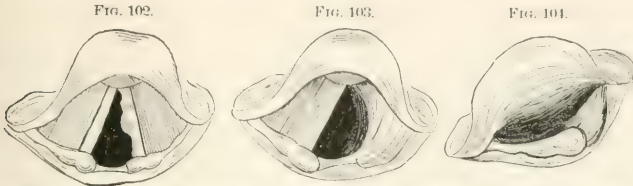
⁹ Ibid., Mar., 1898.

¹¹ Lancet, Oct. 16, 1897.

¹⁰ Brit. Med. Jour., Nov. 27, 1897.

¹² Boston M. and S. Jour., Feb. 3, 1898.

trachea above the tube was packed through the cricothyroid membrane. After incising the thyroid all the soft tissues lying within the left thyroid were dissected out, together with about one-third of the right cord. A small vertical section of both wings of the thyroid was made in the middle line. The wound above the tube was then packed and changed every few hours for a week. A tampon-cannula prevented blood entering the trachea. In 10 days the left arytenoid and part of the thyroid cartilages necrosed and were removed. In 3 weeks the patient could articulate so as to be heard across the room. On Dec. 10 the larynx appeared as in Fig. 103 in inspiration, and as in Fig. 104 in phonation.



FIGS. 102, 103, 104.—Carcinoma of the left vocal cord (J. P. Clark and F. B. Harrington, in Boston M. and S. Jour.).

The voice was somewhat rough, but loud enough for all ordinary purposes. The patient's health was excellent.

Lupus.—Emil Mayer,¹ in July, 1896, treated a case of primary lupus of the epiglottis in which the only subjective symptom was repeated hemorrhage. A large ulcer was found in the center of the epiglottis, extending over the entire laryngeal face. The surface of the ulcer was covered with a grayish-white deposit and the edges were covered with small nodules. Applications of **lactic acid**, 50%, alternating with menthol, 25%, in olive-oil, were made, and creosote was given internally. Treatment was discontinued Aug. 5, 1896, on account of marked improvement. Apr. 16, 1897, the larynx presented the appearance shown in Fig. 105. The excavation caused by the ulceration, with its nodular base, and the edematous swelling of the epiglottis, are well shown. The patient's voice is clear and strong and his health is first-class. In October, 1897, cough supervened, and examination revealed consolidation of both apices, with abundant tubercle-bacilli. This occurrence amply verifies the original diagnosis of primary lupus. His conclusions follow: 1. That primary lupus of the larynx does exist. 2. That it is a painless affection, and may go on for years unnoticed. 3. That tubercle-bacilli are present in small numbers, although difficult to find. 4. That its similarity to syphilis in appearance is greater than to that of tuberculosis. 5. That the absence of adhesive bands is characteristic of lupus, while they are always present in late syphilis. 6. That the prognosis as to life is reasonably good.

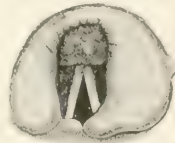


FIG. 105.—Primary lupus of the larynx (Emil Mayer, in N. Y. Med. Jour.).

Lepra of the Larynx.—Paul Bergengrün² finds that the favorite seat of infection by lepra is the epiglottis, especially just above and below the anterior commissure. Induration and ulceration are well marked, and may cause great deformity or destruction of the epiglottis. The aryepiglottic folds and ventricular bands are almost always diseased—either infiltrated, nodular.

¹ N. Y. Med. Jour., Jan. 1, 1898.

² Jour. Laryn., Rhinol., and Otol., June, 1898.

or ulcerated. He found that the disease extends principally through lymphatic infection by bacillary thrombi, which cause giant cells to develop by irritation of the lymphatic endothelium.

Foreign Body in the Larynx.—Charles H. Knight¹ removed by thyrotomy a shoe-hook that had lodged firmly in the ventricle of the larynx for 5 weeks. Repeated attempts to remove through the mouth had failed. After 10 weeks the voice returned without local treatment.

The Vocal Cords and the Voice.—Heryng² said it was not the pearly-white cords that produced the finest voices, the pearly whiteness being often caused by numerous layers of thickened epithelium. Some of the best singers have red, catarrhal-looking vocal cords. Thus the laryngeal treatment of vocalists requires great caution.

Hysterical Aphonia.—John Winslow³ promptly cured a case of recurring aphonia by faradization of the cricothyroid. Thinking that the promptness of the cure indicated hysteria, on the next occasion he interrupted the current with a foot-rheotome before applying the electrode to the larynx. The buzzing noise of the battery continued and the patient was able to speak promptly as before. J. Middlemass Hunt⁴ attributes this form of aphonia to the bad habit or trick of speaking without laryngeal tone. After examining the larynx to see that the ventricular bands do not contract on attempting phonation, he has the patient, with the mirror in the pharynx, phonate all the vowels, beginning with e. When the patient can sing all the vowels with the mirror *in situ*, he withdraws it and repeats the exercise, keeping hold of and slightly dragging on the tongue. Later the exercise is continued without holding the tongue. To sound the consonants with the vowels he sings, with the patient, the numbers from 1 to 10. If the lingual tone is omitted, the vowel must be repeated alone. After the long singing-sounds are acquired the patient is directed to deliver them shortly and sharply in the ordinary speaking-voice. From numbers he passes to reading aloud, and then to ordinary conversation. This requires time and patience. Deep respiration is essential before each attempt to produce a tone. If difficulty is then experienced, the patient is assisted by beginning with a cough, produced naturally or by irritation of the larynx with a probe. If the ventricular bands are found to close tightly on attempted phonation, the patient is directed to inhale with stridor and a short cough. By repeated exercise the true cords will approximate, when the exercises above mentioned can be begun. These preliminaries should be followed by daily exercises in vocalization with the piano. He recommends this method as more certain, and as giving more permanent results than electricity or massage. It does not preclude appropriate internal or hygienic treatment.

Falsetto Voice.—John N. Mackenzie⁵ saw a youth, 2 years past puberty, with falsetto voice and a larynx $1\frac{1}{2}$ in. too high up. With one finger on the Adam's apple and one in the mouth he pushed the larynx into its proper position. Within 2 weeks the boy had a magnificent chest-voice.

Foreign Bodies in the Trachea and Bronchi.—J. Le M. Bunch and R. Lake⁶ report that Cheyne removed a thin plate of bone by tracheotomy from the trachea of a woman who had carried the bone in that position for 9 years. The bone presented such a narrow edge that it had been overlooked, and the swelling and ulceration caused by its presence had been diagnosed and treated as syphilitic disease of the trachea.

¹ Brit. Med. Jour., Nov. 27, 1897.

² Med. Rec., Feb. 26, 1898.

³ Med. Rec., June 4, 1898.

⁴ Jour. Laryn., Rhinol., and Otol., Dec., 1897.

⁵ Treatment, Oct. 14, 1897.

⁶ Lancet, Sept. 25, 1897.

CUTANEOUS DISEASES AND SYPHILIS.

BY LOUIS A. DUHRING, M. D., AND MILTON B. HARTZELL, M. D.,
OF PHILADELPHIA.

INFLAMMATIONS.

Cutaneous Lesions in Acute Articular Rheumatism: the Nature of Erythema Multiforme.—G. Singer¹ observed accompanying rheumatism 7 cases of polymorphous erythema. In 1 case the *Staphylococcus pyogenes albus* was present in the cutaneous eruption. In a case of purpura rheumatica he was able to prove the *Streptococcus pyogenes* in the blood, and in another the *Staphylococcus pyogenes albus* in the urine. Erythema multiforme appeared most frequently in generalized pyemic processes; secondarily, in articular rheumatism. Even that form which is usually considered as being idiopathic showed in its invasion and course such an intimate connection with articular rheumatism that, in the majority of cases, one was forced to think of a rheumatic process in which the joint-symptoms were of secondary importance. Often the skin-eruption is but a local manifestation of the staphylococci and streptococci in the blood. We should regard erythema multiforme, therefore, as a pyemic skin-disease. Inasmuch as it bears a close relationship to acute articular rheumatism, the latter may be considered a pyemic disease.

Erythema Induratum.—Audry,² having studied the lesions of this affection histologically and bacteriologically, concludes that we are not authorized in referring it indirectly to tuberculosis. The histologic lesions appear as a fatty degeneration developed in a region affected by a considerable spontaneous edema. The evidences of inflammation are reduced to a minimum. The malady is to be referred, not to scrofula, but to lymphatism. Audry believes erythema induratum to be only a chronic, at times ulcerative, variety of erythema nodosum.

Five Cases of Erythematous Hysterical Dermatoneuroses.—A. Van Harlingen³ gives the histories of 5 cases of skin-manifestations met with in hysterical patients, and expresses his opinion that they are true dermatoneuroses and not factitious affections of the skin. In each case a feeling of burning or tingling, followed by an erythematous flush, ushered in the eruption. A slight serous effusion follows, sometimes merely loosening the cuticle, at other times giving rise to a bulla. The lesions run a rapid course, drying up and leaving a brown, pigmented spot. He proposes the name "dermatoneurosis erythematousum hystericus" for this class of affections.

Chronic Urticaria Treated with Sodium Nitrite.—J. P. Sawyer⁴ gives his experience in the treatment of chronic urticaria by the use of sodium

¹ Wien. klin. Woch., No. 38, 1897.

² Ann. de Derm. et de Syph., Mar. 1898.

³ Internat. Med. Mag., vol. vi., No. 11, and Jour. Cutan. and Gen.-urin. Dis., Aug., 1897.

⁴ Pacific Rec. of Med. and Surg., Sept., 1897.

nitrite. The patient was a young lady who had been afflicted with urticaria during the summer season for many years. No former method of treatment had been found of any value. Not having been able to discover any cause for the disease, and regarding it as an angioneurosis, 1 gr. doses of sodium nitrite 3 times daily were prescribed. The following day the patient experienced her first complete relief from the affection, and during the warm weather of the entire season she remained practically well. He prescribed it for another one, with the same general result. The withdrawal of the remedy in each case was followed by reappearance of the disease; on readministering the drug the eruption subsided.

Urticaria and Acute Circumscribed Cutaneous Edema.—Oppenheimer,¹ in support of the view that these 2 diseases are absolutely identical, reports 4 cases of urticaria accompanied by great swelling of the eyelids, prepuce, lips, hands, and feet. In 2 of the cases the eruption followed the taking of drugs—oil of sandalwood and sodium salicylate; in the remaining 2 the eating of “high” venison and mussels was the cause. [Without wishing to deny close relationship or possible identity of urticaria and acute circumscribed cutaneous edema, we must confess our inability to discover proof of such in the reports of these cases, since we do not find in them the symptoms of the latter disease as described by Quincke and others, but only such edema as is always observed when urticaria attacks parts containing much loose cellular tissue.]

Treatment of Eczema with Picric Acid.—A. Brousse² notes that the keratoplastic property of picric acid, which has been successfully used in burns, indicates that its employment is proper in eczema. Cérali, in 1889, employed this drug in 7 cases of eczema with good results. McLennan, of Glasgow, also employed it successfully in acute eczema and eczema of the face, used in a saturated solution. The author has obtained rapid recovery in several cases in which he has employed this treatment. In papular eczema with a thick epidermis the acid was useless; but in acute oozing eczema accompanied by edema of the skin it was very useful, recovery in 1 case being obtained in 2 weeks, in another in 10 days. Immediate relief is afforded by the picric-acid solution, allaying pain, heat, and itching. The rapidity with which edematous tumefaction is controlled and the absolute painlessness of the dressing, even when it is applied to the bare surface of the derma, are striking. Most observers agree that even the extensive application of this drug does not give rise to any symptoms of poisoning. It is also useful in the acute attacks of chronic eczema which are so frequent in arthritics, particularly if they are accompanied by oozing and excoriation of the skin; it is equally useful in the impetiginous eczema of infancy. The author states that the results obtained by him with this treatment confirm those given in the articles of McLennan, Gaucher, and Leredde. Brousse concludes by stating that this treatment is contraindicated in chronic eczema, and generally in those forms which are accompanied by thickening of the epidermis (lichenoid eczema); but even in these cases it allays the itching.

Etiology and Pathogenesis of Psoriasis.—Kuznitsky³ states that it is not correct to say that psoriasis appears exclusively or chiefly in otherwise sound individuals. Psoriasis may occur upon mucous membrane and also upon cicatrices. The parasitic theory of psoriasis is untenable. Psoriasis itself is not transmissible, but the disposition to psoriasis is. The latter element is an abnormal irritability of the central nervous system. The

¹ Lancet, Feb. 26, 1898.

² Nouveau Montpellier méd., Sept., 1897.

³ Arch. f. Derm. u. Syph., Band xxxviii., Heft 3.

arthropathies in severe psoriasis are probably not to be identified with either rheumatism or gout. These peculiar arthropathies variously observed in severe psoriasis are with great probability coördinate with psoriasis, and are to be traced to the same cause—viz., a chronic condition of spinal irritation. It is certain that psoriasis may arise directly in connection with psychic affections. It is just as certain that extensive psoriasis can disappear spontaneously in the briefest period. Psoriasis may appear strictly unilateral. Hyperemia is the primary change in the pathogenesis of the psoriasis-eruption, and is neither of an inflammatory nor parietic nature, nor is it the result of stasis, but is to be regarded as an angioerethistic process. First attacks of psoriasis have been observed to follow closely mechanical irritation. In psoriasis there exists an irritation of the spinal vasomotor ganglia, which may be inherited or acquired. It is possible that it is only functional; but the possibility remains that in many cases lesions of the substance of the spinal cord exist.

The Connection of Psoriasis with Gout and Diabetes.—Karl Grube¹ reviews the literature of the subject and reports 9 cases of his own in which psoriasis coexisted with gout or diabetes, or both, and comes to the conclusion that a causal relation between those affections may exist. In most of the author's cases an acute gouty attack or an increase in the quantity of the excreted sugar exerted an unmistakably favorable influence on the psoriasis. On the other hand, in 1 case when the sugar was reduced to a minimum the psoriasis became greatly aggravated.

Vaccinal Psoriasis.—Vignal² understands by vaccinal psoriasis a psoriasis which shows itself immediately after vaccination in a subject previously free. Cases of this sort are very rare, and are not to be regarded as an argument in favor of the parasitic nature of the disease. The vaccine plays only the role of a provocative agent in a subject already predisposed to the affection. As to the nature of the predisposition, it seems to be a trophic trouble developed under the influence of either a nervous lesion or arthritis.

Treatment of Psoriasis.—Norman Walker,³ in the treatment of psoriasis of the scalp when it is much inflamed, recommends the use of a weak ammoniated mercury ointment, 5 gr. to the ounce, the strength being gradually increased. When there is not much irritation sulphur and salicylic acid are very useful. They may be used as ointments in the strength of 10 to 30 gr. to the ounce. When the general surface is involved warm baths are valuable, followed, when the lesions are limited and not inflamed, by chrysarobin in liquor guttæ perchæ, or tar in collodion, 20 gr. to the ounce. The compound chrysarobin ointment of Unna is recommended. This ointment is composed of chrysarobin, 5 parts; salicylic acid, 2 parts; ichthyol, 3 parts; petrolatum, 90 parts. The internal remedies of most value are arsenic, potassium iodid, sodium salicylate, and thyroid gland. The last must be employed with caution, and should be used only in severe cases.

Treatment of Psoriasis with Cacodylic Acid.—Danlas⁴ reports the successful use of this substance upon a man, aged 46 years, who had suffered from this disease for 26 years. For the past 6 years he had received all forms of treatment; but without other treatment than this the disease retrograded, the exfoliation was less marked, the redness disappeared, and the thickening of the skin was lessened. The patient became paler, but did not lose flesh. The formula is: Cacodylic acid, 5 parts; rum, 40 parts; syrup of orange-peel, 40 parts; distilled water, 120 parts, with oil of peppermint for flavoring. Six teaspoonfuls of the mixture were taken each day for 3 weeks, when 4 were

¹ Berlin. klin. Woch., Band xxxiv., Heft 52, S. 1134.

² Thèse de Lyons, 1897.

³ Quart. Med. Jour., July, 1897.

⁴ Therap. Woch., No. 22, p. 560, 1897.

found to be sufficient. Other than an odor of garlic in the breath and slight gastric disturbance at the third week, no untoward symptoms were noted.

Ointment for Psoriasis.—The following formula is recommended by Richter¹ for psoriasis, and it would seem has achieved some popularity: Ichthyol, salicylic acid, pyrogallie acid, *aa* 3 parts; olive-oil, lanolin, *aa* 10 parts.

Pityriasis Rosea.—Tandler,² from a study of 27 cases, concludes that Kaposi is wrong when he states that this disease is identical with what he terms herpes tonsurans maculosus. No microorganisms except a few staphylococci could be cultivated from the lesions, nor could the trichophyton be demonstrated in any of the sections of skin examined. The only changes found were in the corium, and these were of a purely inflammatory nature. The affection, therefore, is not mycotic.

The Microscope in the Diagnosis of Ringworm.—Norman Walker³ points out that unless the microscope is properly used no information of value will be obtained from an examination. An error to be avoided is the mistaking of oil-drops for spores and minute threads, and the outlines of cells for mycelium. If accurate results are desired, it is necessary to resort to some method of staining; and that designed by Colhoun is superior, in Walker's opinion, to any other. This method is as follows: The hairs or scales are placed upon a slide, and a drop of anilin gentian-violet or alum gentian-violet, 1:100 to 5:100 is added. After staining for 5 minutes they are treated with Gram's solution and dried with blotting-paper. They are then decolorized with anilin-oil to which enough iodine has been added to make it of a dark-sherry color. If the specimen is to be preserved, it must be washed in pure anilin and then in xylol before mounting.

Some Undescribed Forms of Herpes Tonsurans.—Stern,⁴ in an epidemic of herpes tonsurans in Mannheim, observed a considerable number of unusual forms of the disease. In 2 cases the malady attacked the mucous membrane of the lower lip and the cheek, spreading from the chin. In one case there were large, partly hemorrhagic blebs on the face, accompanied by nodules in the beard and kerion of the temple; and there was likewise a marked swelling of the left external ear, which was dark red and moderately painful to the touch, and had existed for 6 months. Numerous mycelia were found in the pus expressed from a small opening upon the upper edge of the helix. In a case characterized by a squamous and nodular eruption situated upon the nape of the neck ulcerative destruction of one of the nodules occurred, producing an ulcer 2 cm. in diameter. In the case of a girl, aged 17 years, having numerous scaly patches on the trunk and extremities, in which trichophyton fungus was demonstrable, there were numerous more or less elevated nodules situated over the sacrum, on the buttocks, the breasts, abdomen, and upon the anterior and posterior surfaces of the thighs. In a few instances lanugo-hairs extracted from these nodules were found to contain the trichophyton.

Ringworm as it Appears in Boston.—C. J. White⁵ gives his conclusions, based upon about 200 microscopic examinations and between 300 and 400 inoculations. The *Microsporon Audouini* occurs in the majority of cases of ringworm of the scalp; in Boston, 95% of all cases are due to this fungus; in Paris, 60%; and in London, from 80% to 90%. This fungus has not

¹ Gaz. hebdom. de Méd. et de Chir., May 1, 1898.

² Arch. f. Derm. u. Syph., Band xxxvii., Hefte 1 and 2.

³ Scottish M. and S. Jour., Sept., 1897.

⁴ Arch. f. Derm. u. Syph., Band xlv.

⁵ Proc. Boston Soc. Med. Sci., May, 1897.

been found on the scalp after the age of 14 years. In France this variety has not been isolated from the beard or from the smooth skin; but in England it has been found in the beard, and in Boston it was encountered 3 times in the beard and 3 times on the general surface of the body. Thus, in Boston it is the commonest form of ringworm, causing 56% of all cases of the affection. It always occurs on the outside of the hair, and consists of innumerable small (about 3μ in diameter), round spores arranged like a mosaic, rarely any mycelium. The *megalaspora* occur both inside and outside the hair, at times the entire shaft being invaded and surrounded, and are from 5 to 7μ in diameter. They are not round, but rectangular, and the mycelium is always present. A few drops of ether, followed by 40% solution of caustic potash, applied to the hair reveal these fungi.

Ringworm of the Scalp in an Adult.—Colcott Fox,¹ at a meeting of the Dermatologic Society of London, presented a man, 42 years of age, with ringworm of the scalp, there being 2 finger-nail-sized patches. With the aid of a magnifying-glass black stumps of broken hairs could be seen in the follicles. Microscopic examination of these in liquor potassæ revealed the presence of fungus, and cultures made from the hairs were typical of the *Endothrix trichophyton*. The man had probably contracted the disease from his son, 15 years of age, who had a scaly patch on the scalp.

Granuloma Trichophyticum (Majocchi).—Pini² reviews the literature of this unusual form of trichophytosis, and reports 3 new cases, from which he draws the following conclusions: There exists a clinical complication of herpes tonsurans which differs from kerion and sycosis. It consists of round or flat nodules from a rose-red to a cyanotic hue, disseminated or, more frequently, arranged in chains, developing very slowly, inclining to soften, but never ending in suppuration. The histologic structure of these nodules is different from those formed through inflammatory folliculitis, and is like that of the granulomata. The etiologic factor is the trichophyton, which occurs within the granuloma in the form of hyphæ and spores.

Trichomycosis Palmellina (Pick).—Eisner³ states that Pick, in 1875, under this name, first described a disease which usually affects the hair in the armpits, on the pubis, and on the inner side of the thigh, covering it with a jelly-like yellowish mass, which sometimes encompasses the whole and sometimes only lies on the hair-shaft. The hair is rough and uneven, and may be attacked from its follicular opening to its end; but the intrafollicular portion is always found free. The microscope will often reveal wart-like masses upon the hair-shaft; while macroscopically nothing abnormal can be seen. When the mass becomes dry it cannot be removed without splitting or breaking the hair. The cleanest persons may be attacked with the disease, especially those with light hair. Some writers are of the opinion that colored sweat in the axilla is due to the same parasite. Under the microscope the jelly-like mass lies on the surface of the hair or under detached cortical scales, or between split fibers of the hair-shaft. In the last instance the hair may be broken, ending with a brush-like termination. Stained sections of the affected hair show globular bodies, consisting of cocci, arranged in clusters or in rows, or in groups of 4, upon the surface, and sometimes in the inner portion of the hair. The cocci grow rapidly upon sugar-agar or bouillon.

Treatment of Tinea Tonsurans.—Sheffield⁴ states that by the following method every case of ringworm of the scalp may be cured in from 3 to 6 weeks. The hair is to be clipped closely to the scalp, and the following mixture

¹ Brit. Jour. of Derm., July, 1898.

² Arch. f. Derm. u. Syph., Band xlii., Heft 1.

³ Ibid., Band xli., S. 39.

⁴ N. Y. Med. Jour., May 14, 1898.

thickly applied, by means of a painter's brush, once every day for 5 successive days: *Acidi carbol.*, *ol. petrolei*, $\bar{a}\bar{a}$ 65 parts; *tinct. iodi*, *ol. ricini*, $\bar{a}\bar{a}$ 110 parts; *ol. rusci*, q. s. ad 500 parts. On the sixth day the application is to be wiped off with a rag dipped in olive-oil, the hair clipped again, and the scalp washed thoroughly with green soap and a soft nail-brush. This process is to be repeated regularly for 3 or 4 weeks, and is to be then followed by the application of a 10% sulphur ointment for a few days. Finally the following lotion is to be used for 2 weeks: *Resorcin*, *acid. salicylic.*, $\bar{a}\bar{a}$ 16 parts; *alcohol*, 120 parts; *ol. ricini*, q. s. ad 500 parts.

Eruptions after Mercurial Inunctions.—G. G. S. Taylor¹ reports unusual forms of eruption following inunctions of mercury. The first case was that of a woman, aged 60, who rubbed in the skin $\frac{1}{2}$ oz. of blue ointment. An hour afterward she awakened with burning and itching, and rubbed in some more. On admission to the hospital it was found that the horny layer had been completely exfoliated, from the umbilicus to the knees, the process having been preceded by a wrinkling of the epidermis without any inflammation of the skin. The second case occurred in a young man after secondary symptoms of syphilis. The treatment had been inunctions with mercurial ointment. The patient was emaciated, and the entire surface of the body was red, dry, and scaling, except the axillæ, which were moist from perspiration. The general appearance of the skin was brownish; desquamation occurred in flakes. The third case was one of exfoliating dermatitis. The patient was a woman, aged 21, with a history of hereditary syphilis. Various remedies were tried unsuccessfully, when inunctions were instituted. On the fourth day a red rash appeared on the forehead. This so much resembled scarlatina that the patient was isolated. Two days later desquamation began, but the symptoms did not improve. She gradually grew worse, and died comatose.

Dermatitis Medicamentosa.—Hall² reports a number of cases of eruption due to drugs. In one the administration of potassium iodid, instead of the usual pustular lesions, produced irregular patches of bright-scarlet erythema of large size, which in places showed vesiculation, particularly upon the lobes of the ears. In a second case the administration of arsenic was followed by a pustular eruption on the back, legs, arms, and hands. Sodium salicylate produced a mixed rash consisting of erythema and nodules, which disappeared upon suspension of the drug. In 2 cases of extensive burn treated by the application of boric acid a fatal intoxication occurred. In one of these cases a scarlatiniform eruption appeared after 4 days' use of the drug, accompanied by elevation of temperature (102° F.) and semidelirium.

Méneau³ divides arsenical intoxication into acute, subacute, and chronic. The acute forms, which may result from contact, are rare; they are characterized by eruptions which are usually pustular, but sometimes gangrenous. Poisoning from ingestion of the drug is much more common and varied in character. Eruptions resulting in this manner are erythematous, ecchymotic, papular, erysipelatous, pustular, or bullous. Gangrene may likewise occur. These eruptions are not uncommonly intensely pruritic. Generalized exfoliating dermatitis was a feature in a large number of cases in one epidemic. A symptom of arsenical poisoning which deserves special mention is keratosis of the palms, which, as pointed out by Hutchinson, presents 3 stages: Dryness and itching, the appearance of minute indurations, and termination in epithelioma.

¹ Brit. Jour. of Derm., Sept., 1897.

² Clinical Jour., vol. x., No. 19; Jour. Cutan. and Gen.-Urin. Dis., Nov., 1897.

³ Ann. de Derm. et de Syph., No. 4, 1897.

The active principle of *Rhus toxicodendron*, according to Pfaff,¹ is not toxicodendric acid, but a nonvolatile oil, which, even in small quantities, is intensely irritating. This oil, called toxicodendrol, produces inflammation and fatty degeneration of the kidneys, like cantharides. The results of exposure to its influence may appear within a period varying from 19 hours to 9 days. Being insoluble in alcohol and precipitated by lead acetate, it is advisable to wash parts exposed to it with an alcoholic solution of this lead-salt.

Severe Eruption from Salipyrin.—F. Schmey² details the history of a man of 54, who had formerly been treated for nephritis: 60 gr. of powdered salipyrin were given in 4 doses. The next day an eruption appeared upon his scrotum, which became a large, markedly edematous, infiltrated red surface. The following day the patient, against advice, repeated the drug. Necrosis of the affected areas followed, and a deep wound was left, which healed under sublimate solutions. The urine showed albumin.

Disseminated Gangrene of the Skin due to Potassium Iodid.

—Audry³ reports the following case: A woman, aged 47 years, after an attack of seborrheic eczema of the face, suffered from extreme nervousness, and upon the advice of a pharmacist took potassium iodid internally, which produced a characteristic bullous eruption. Abstinence from the drug was followed by speedy cure. Two years later she again took a preparation containing potassium iodid for a period of 6 months, at the end of which time she presented herself with large ulcerations of the skin in the left axilla, beneath the left breast, in the bend of the left elbow, on the scalp, in the perineocrural and in the lumbar regions, the most extensive lesions being in the two latter-named situations. The ulcers were sharp-cut, with slightly elevated borders. The mucous membranes were unaffected. The urine contained neither sugar nor albumin; but the patient's general health was bad.

Herpes Zoster.—Weber⁴ finds that a dusting-powder composed of equal parts of bismuth subgallate and tale is a useful application in herpes zoster; where this does not prove effective an ointment of 1 part of bismuth subnitrate and 3 parts of cold cream will relieve the burning. For the neuralgia which so often accompanies or follows it, quinin in large doses is probably the best remedy; potassium iodid, strychnin, and galvanism may be employed after quinin fails.

Etiology of Zoster.—W. G. Hay⁵ contributes a lengthy and well-digested article on this subject. His conclusions may be summarized as follows: 1. Among a number of zosteriform eruptions zoster is a distinct disease that runs a definite course. 2. True zoster is of infectious origin. 3. The herpetic eruption in genuine zoster is preceded by adenopathy in the neighborhood of the eruption, and often by bilateral or even general adenopathy. 4. The eruption is in the nature of a trophic disturbance, and probably the infective agent has a selective affinity for the sympathetic ganglia. Segments of the cord and the tracts supplied from these segments are affected rather than any individual spinal nerve.

Recurrent Herpes Zoster, with Remarks on its Etiology.

—George Pernet⁶ relates a case in which there occurred 4 attacks of zoster. The first, in December, 1891, was a right intercostal zoster. The second, a year later, was about the angle of the right jaw. The third, February, 1896, was also on the right side of the face. The fourth attack, November, 1896, was

¹ Jour. Exper. Med., Mar., 1897.

² Therap. Monats., Heft 3, S. 175, 1897.

³ N. Y. Med. Rec., July 9, 1898.

⁴ Brit. Jour. of Derm., May, 1897.

⁵ Ann. de Derm. et de Syph., No. 11, 1897.

⁶ Jour. Cutan. and Gen.-Urin. Dis., Jan., 1898.

over the right temple. Since the last attack the patient's vision has been somewhat defective. In summing up the etiology of the disease in this case, the opinion is expressed that this eruption was produced by traumatism and an uncorrected error of refraction of both eyes.

Dermatitis Herpetiformis.—Hallopeau and Lafitte¹ confirm the value of eosinophilia occurring simultaneously in the blood and bleb-serum as a diagnostic sign of this disease. Two cases were examined, the cells and granules being found in number; while in one case of pemphigus foliaceus a few were discovered only in the blood. Danlos² states that these cells occurred in abnormal quantity in two of his cases. Hehir³ records a series of cases, in the bleb-serum of which he found a small diplococcus enclosed in a thin capsule. They were met with in the leukocytes, singly, in pairs, or groups. This author recommends the use of ichthyol externally and arsenic and pilocarpin internally.

Ichthyol in Dermatitis Herpetiformis.—J. A. Fordyce,⁴ in a severe case of dermatitis herpetiformis, found that the application of a 10% solution of ichthyol in oil gave quick relief to the violent itching. It was found to be superior to various other drugs in the form of solutions and ointments that had been previously applied. The case was a grave one, and chronic.

Pemphigus Neonatorum Associated with a General Infection by the Staphylococcus Pyogenes Aureus.—L. Emmet Holt⁵ reports the following case: In an infant, 9 days old, there was an eruption of bullæ over the shoulders and lower part of the body. These bullæ varied in size from $\frac{1}{4}$ to 1 in. in diameter, the contents being cloudy. Some of them were ruptured, exposing a red base; others were superficially ulcerated, secreting pus. There was likewise purulent ophthalmia. There was no history of syphilis. A bacteriologic examination of the contents of the bullæ revealed the presence of a pure culture of the *Staphylococcus pyogenes aureus*, and the same microorganism was found in pus from the eye. No gonococci were found. At the autopsy the lungs and liver were found involved, the same staphylococcus being present, combined in the first instance with the *Bacterium lactis aërogenes*; in the second with the *Streptococcus longus*. Inoculations in mice gave positive results. The author is of the opinion that cases formerly regarded as syphilitic belong to this class.

Congenital Bullous Dermatitis.—J. T. Bowen⁶ reports a case of this rare disease, the illustration of which is reproduced (Plate 11). The patient was a girl, aged 12 years. When 3 weeks of age a "blister" appeared on the dorsum of the foot, since which date there have been constant recurrences of blebs, limited for the most part to the extensor surfaces of the legs, especially the knees and feet, elbows, backs of hands and wrists, appearing more frequently in summer than in winter, and are often produced by a slight blow or knock. The blebs were often hemorrhagic, followed by pigmentation, and at times the seat of itching, and are sometimes followed by slight scarring. In the areas chiefly affected bodies closely resembling milia were seen to exist.

A Case of Impetigo Herpetiformis.—M. B. Hartzell⁷ reports the case of a woman, 80 years of age, unusually vigorous for her years. For several months she had suffered from a pustular eruption characterized by a marked tendency to occur in groups, to form crusted patches surrounded by a border of milary pustules, and to appear in successive outbreaks. There was an

¹ Ann. de Derm. et de Syph., t. vii., p. 1442.

² Ibid., t. viii., p. 288.

³ Indian Med. Gaz., Apr. 1, 1897.

⁴ Jour. Cutan. and Gen.-Urin. Dis., Nov., 1897.

⁵ N. Y. Med. Jour., Feb. 5, 1898.

⁶ Jour. Cutan. and Gen.-Urin. Dis., June, 1898.

⁷ Ibid., Aug., 1897.

PLATE II.



Epidermic cysts in a case of congenital bullous dermatitis (Bowen).

eruption coincidently upon the lingual mucous membrane. Septic symptoms, such as chills, fever, and diarrhoea, occurred in the final stages of the malady, which terminated in death 3 months after its first appearance. An analysis of the more important features of all the cases reported, 21 in number, exclusive of his own, is appended.

Impetigo Herpetiformis or Dermatitis Herpetiformis?—J. A. Fordyce¹ reports a case occurring in a man aged 66. The eruption when first seen was nearly universal. It was made up of grouped vesicles and vesicopustules, which became confluent over the legs and arms. Over the thighs and abdomen large irregularly rounded plaques were seen, which extended in a peripheral manner, while slowly clearing in the center. A new outbreak of lesions was accompanied by elevation of temperature and intense pruritus. After existing for several weeks the eruption slowly disappeared, leaving larger pigmented areas, on which new groups of vesicopustules would appear. Papillomatous lesions developed in both axillary spaces. Albumin and some granular casts were found in the urine. The blood and serum from the vesicles contained a large number of eosinophile cells. Microscopic examination of excised skin showed an acute inflammation of the derma and the presence of vesicles in the deep layers of the epidermis, with polynuclear leukocytes and eosinophile cells. The eruption presented certain features pertaining to both impetigo herpetiformis and Dühring's disease, and seemed to justify the view which this writer originally held, that they should both be included in the same class.

Case of Impetigo Herpetiformis (Hebra) in the Male.—H. H. Whitehouse² reports a case of this rare disease occurring in a man aged 39, an illustration of which is reproduced (Plate 12). Only 2 cases are referred to by the author as having been met with heretofore in the male (Kaposi's and Dubreuilh's cases). The disease, which ran a fatal course, was characterized by repeated outbreaks of innumerable small pustules, accompanied by febrile and other general symptoms, the lesions being pustular from the beginning. The cutaneous lesions resembled dermatitis herpetiformis and also pemphigus.

Oil of Turpentine in Acne Rosacea.—O. Betz³ speaks well ofunctions of oil of turpentine in this disease, its value having been discovered by accident, it having been prescribed for a patient with bronchitis to apply to the chest. The patient, a woman, at the time was suffering from acne rosacea and rubbed the drug into the affected skin, which was followed by a disappearance of the acne rosacea. Another case of acne rosacea that had persisted for 7 years was relieved after a month's use of this drug in a like manner.

A Resorcin Ointment for Acne.—Ehrmann⁴ recommends in acne the regulation of intestinal action. For a local application a 15% resorcin ointment should be made thick—*e. g.*, Resorcin, 3 parts; lanolin, 15 parts; simple ointment, 5 parts. The salve should be left on for 15 hours and then washed off with a mild soap. Sooner or later the skin peels off, when the treatment with resorcin must be omitted and a simple salve substituted for a few days. Papulopustules and pustules should be incised, and a drop of 20% solution of carbolic acid in alcohol inserted to prevent further development of bacteria. [We think the value of this remedy has been overrated in this disease.]

Ulerythema Sycosiforme (Lupoid Sycosis).—J. A. Cantrell and J. F. Schamberg⁵ report 2 cases of this rare disease. The first was a man

¹ Jour. Cutan. and Gen.-Urin. Dis., Aug., 1897.

² Ibid., Apr., 1898.

³ Jour. des Prat., Mar. 6, 1897.

⁴ Therap. Woche., May 9, 1897.

⁵ Jour. Am. Med. Assoc., Apr. 16, 1898.

aged 55, who suffered for 3 years from apparently an ordinary sycosis, which finally passed into the following condition: Upon the right side of the face was a pyriform patch, 4 in. in length, extending from the angle of the jaw to the zygoma, and covered with a remarkably smooth, glistening, pinkish-red, cicatricial skin, the latter being thickened and infiltrated. The diseased area was slightly depressed, with fairly well-defined borders. Some portions of the patch showed complete loss of hair. Disseminated here and there were a half-dozen or more flat vesicles and blebs, which when ruptured gave rise to yellowish-brown crusts. Upon the corresponding part of the left cheek was a smaller and more recent patch with similar characteristics. The areas spread by peripheral extension, the advancing border often being studded with pustules. The vesicles and blebs appeared suddenly every few days, and were attended by such severe itching as to cause their mechanical rupture. The only remedies of value were sedative applications, such as calamin lotion. Microscopic examination of an excised section of skin revealed nests of sharply defined cell-infiltration, particularly around the hair-follicles. Giant cells and tubercle-bacilli were absent. The second case was a man of 35 years, who had for 6 years been annoyed with a pustular affection of the beard. It consisted of irregular-shaped patches upon each side of the face, below the zygoma and anterior to the auricle, which were whitish, smooth, shining, and apparently atrophied. The border was elevated and keloidal in character. There was complete atrophy of the hair-follicles over the affected area. A number of follicular pustules indicated the line of downward extension of the process. There were no vesicles or blebs present. The authors conclude their article by saying: While the affection simulates lupus vulgaris both clinically and pathologically, it is evident it is not identical with that disease. The cicatricial appearance, the extreme rebelliousness to treatment, and the circumscribed cell-infiltration are certainly suggestive of lupus. On the other hand, the absence of lupus-nodules and ulceration, and the absence of giant cells and tubercle-bacilli, prove the affection to be something else. The disease is therefore to be regarded as a distinct clinical entity.

Ulceration Due to the *Bacillus Pyocyaneus*.—Triboulet and Tollemer¹ reported at a meeting of the Société Anatomique de Paris the case of an infant, aged 10 months, who suffered from disseminated, cup-shaped and round ulcerations. Cultures prepared from these lesions revealed the presence of the *Bacillus pyocyaneus*. At the autopsy blood from the heart was found to contain the same organism. Sections of the skin showed that the bacilli were present only in the superficial layers of the derma, the capillaries being free from them. From these facts it would seem that the cutaneous ulcerations were the port of entry for the bacillus which caused the septicemia.

Multiple Gangrene of the Skin.—Hintner² reports a case of multiple gangrene of the skin. The patient was a nervous, anemic woman, 21 years of age. After a burn upon the left hand a vesicular eruption attended by severe stinging-pain appeared, at first limited to the left arm, but later distributed over the whole body. With evacuation of the vesicles upon the left arm discoloration occurred and an eschar formed, which fell off after a considerable time, and healed with the formation of scar-keloid. Upon other portions of the body the lesions behaved somewhat differently. The blebs were tensely filled with pure serum or serum and blood, and ruptured after a short time, laying bare the corium; these healed by granulation without the formation of an eschar. After several outbreaks recovery took place, the

¹ Ann. de Derm. et de Syph., No. 2, 1898.

² Arch. f. Derm. u. Syph., Band xxxviii., Heft 2.

PLATE 12.



H. H. Whitehouse's case of impetigo herpetiformis in a male.

affection having lasted over a year. The reporter believes the nervous system plays an important part in the disease.

Xanthoma Glycosuricum.—J. Schwenter-Trachsler¹ cites a case (with chromolithograph), discusses the subject, and concludes from his case and others: 1. That this disease occurs chiefly in middle life, and generally in corpulent, healthy-feeling persons. 2. The patients have always sugar (grape-sugar or pentose) in the urine. 3. Men are more frequently affected than women. 4. Icterus stands in no relation to this disease. 5. The eruption on the skin appears quickly and disappears again at the end either of months or years. 6. The cutaneous lesions are firm, solid papules, sharply defined, embedded in the skin, with yellow summits and hyperemic, red bases, the redness being most distinct in recent papules. 7. The eruption occurs most frequently on the extensor surfaces of the extremities. 8. The prognosis is generally favorable, though there exists a disposition to recurrence; but this depends on the sugar in the urine.

HYPERTROPHIES AND ATROPHIES.

Diffuse Scleroderma.—Osler² reports 8 cases of this uncommon affection: 3 of these were associated with arthropathy, in 1 pulmonary tuberculosis was present, in 1 the scleroderma appeared shortly after Graves's disease, in 2 there were marked vasomotor changes in the extremities, and in 1 there was intense general pigmentation with patches of leukoderma. In 6 of the cases reported thyroid-gland extract was administered for periods varying from 10 days to 19 months. In 2 of the cases thus treated the disease made no progress while under treatment; but in none of them did the skin become softer or resume its normal appearance. The author's personal experience does not lead him to favor the treatment of scleroderma by thyroid gland.

Salol in the Treatment of Scleroderma.—A. Phillipson³ reports 2 cases of the diffuse form of this disease (one moderately severe, the other severe) treated with salol. The first was cured after 18 months' treatment; the second was distinctly improved after $5\frac{1}{2}$ months, the dose being from 30 to 45 gr. daily. This drug may be taken for a long period continuously without disturbing the stomach. Light gymnastics are also recommended.

The Treatment of Scleroderma by Electrolysis.—Brocq⁴ reports 8 cases of scleroderma occurring in plaques and bands treated successfully by electrolytic puncture. The method employed is much the same as that for the destruction of hairs. The strength of current to be employed will depend upon the sensitiveness of the patient and the infiltration of the tissues. In timid patients the current-strength should be from $\frac{1}{2}$ to 2 ma.; in more courageous ones, 5 to 10 ma. When the tissues are deeply infiltrated the current must be allowed to pass for a longer time than when the plaques are thin. After two or three *séances* the progress of the disease is almost always stayed. The use of electrolysis should be combined with applications of mercurial plaster made between the sittings.

Leukoderma Treated by Carbolic Acid.—Savill,⁵ at a meeting of the Dermatological Society of Great Britain and Ireland, showed a girl, aged 16 years, in whom there were numerous white patches surrounded by zones of brown pigmentation in the groins, on the abdomen, and the legs. Over the

¹ Monats. f. prakt. Derm., Sept., 1898.

² Jour. of Cutan. and Gen.-Urin. Dis., Feb. and Mar., 1898.

³ Deutsch. med. Woch., No. 33, 1897.

⁴ Ann. de Derm. et de Syph., No. 2, 1898.

⁵ Brit. Jour. of Derm., Mar., 1898.

sacrum, the nape of the neck, and in the armpits were patches of brown discoloration only. The patches on the nape of the neck and the sacrum were painted with pure phenol. At the end of 3 weeks the skin had resumed its normal pink color.

The Nature and Cause of Common Baldness.—M. Sabouraud,¹ from a study of baldness, to which he was led by his former studies of tinea, alopecia areata, and seborrhea, concludes as follows: The specific microbacillus of fatty seborrhea, when introduced into the pilosebaceous follicle, produces 4 constant results: (a) Sebaceous hypersecretion; (b) sebaceous hypertrophy; (c) progressive papillary atrophy; (d) death of the hair. These phenomena result from seborrheic infection upon smooth regions as well as upon the hairy ones. Upon the scalp the vertex is the seat of election of this infection. Common baldness is only a chronic fatty seborrhea of the vertex. Not only is follicular seborrheic infection indispensable in the production of baldness, but this seborrheic infection remains intense, pure, and permanent until the baldness is fully and permanently established. Common baldness is therefore [according to this author] a perfectly characterized, specific, microbial malady.

Tannochloral, or Captol, in Seborrhœa Capitis.—J. Eichhoff² obtained excellent results in seborrhœa capitis when a 2% alcoholic solution added to water was used night and morning. In 8 to 14 days the scales disappeared, the gland-secretion stopped, the hairs fell less and less, and the fall was finally arrested. He considers it the best remedy for the purpose. It is a combination of tannin and chloral hydrate; it is a hygroscopic brown powder, little soluble in cold water, but more so in warm water and in alcohol, and is decomposed by alkalis. It is said to combine the secretoinhibitory effects of tannin with the antiparasitic action of chloral hydrate.

Ringed Hair (Trichonosis Versicolor, Wilson).—A. W. Brayton³ exhibited to the Section of Cutaneous Medicine of the American Medical Association, at its 1897 meeting, specimens illustrating this rare condition from the head of a strong youth of 15. The hirsute peculiarity was not noticed until his second year, when a barber declined to cut his hair, "because there was sand in it, which would dull his shears." Examination showed the "sandy" appearance to be due to alternating rings of light and brown, which were visible in each hair and extended from the base to the tip. The mother then recalled that 2 of her brothers had similarly ringed hair. The 4 brothers and the sister of the patient have perfectly normal hair. The specimens of hair were of equal length, and averaged from 20 to 30 rings to the inch of shaft. In 1 of 100 hairs the brown color greatly predominated. The hair was becoming browner each year.

Treatment of Hypertrichosis by Electricity.—Brocq,⁴ who has had a large experience with this method of treatment, calls attention again to his method of operating, points out the indications for its application, and reviews statistics of 110 patients. His monograph is divided into 3 parts: First, an exposition of the method; secondly, the results; thirdly, the indications for the employment of the operation. He uses an extremely fine irido-platinum needle 22 to 23 mm. long, and strongly advises that it should be bent about 6 mm. from the point at an angle of about 45 degrees. When thus bent its introduction is incomparably more easy than when straight, especially in certain regions. It is indispensable for success that the needle should

¹ Ann. de Derm. et de Syph., No. 3, 1897.

² Deutsch. med. Woch., Oct. 7, 1897.

³ Jour. Am. Med. Assoc., vol. xxiv.

⁴ Treatment, Feb. 2, 1898; Ann. de Derm. et de Syph., Nos. 8, 9, 10, 11, 1897.

be introduced into the follicle; and to make certain of this and to avoid unnecessary pain, it is important that the current should be off during the introduction, as well as during the removal, of the needle. The force of the current employed will vary according to the size of the hair to be destroyed, the region operated upon, the special resistance of the integument, and the tolerance of the subject to pain. Downy hairs require currents of only 1 to 2 ma.; hairs of medium size and depth of implantation will need 2 to 3 ma.; and 4 to 5 ma. will suffice for the strongest if properly applied. When the needle is improperly placed, not in the follicle, a dead-white area is produced. When well inserted an erythematous macule arises. Local anesthesia is not satisfactory on the face. Brocq does not, as a rule, exercise traction on the hair operated upon until the end of the *séance*. If the papilla has been destroyed the hair will be found separated. He never operates at the same or consecutive *séance* on two closely placed hairs. He rightly insists on the desirability of thoroughly discussing with the patient the operation from all points of view before starting in earnest.

Etiology of Trichorrhæxis Nodosa.—Bruhns¹ has observed that trichorrhæxis nodosa capillitii is of frequent occurrence in women in Berne and vicinity. It has not been proved that the disease is produced by specific bacteria. The author failed to find any bacteria in 6 of his cases, and inoculation upon the hairs of other individuals was negative. It is improbable that it is due to mechanical causes. There must be some predisposition to it; possibly it is a disturbance of nutrition.

This disease, or a very similar manifestation as it occurs on the beard, on the other hand, is regarded by Spiegler² as being parasitic. This writer says, concerning **trichorrhæxis nodosa barbæ**, that it is a parasitic affection produced by a bacillus, most probably identical with that described by Hodara, which is found constantly in diseased hairs as heaps of cocci, as well as rods up to 12 μ long, not only in the hairs themselves, but in the subepidermal part of the hairs and in the cells of the wall of the follicle. It may be cultivated upon the usual media. Sound hairs do not show such colonies, nor can the bacillus be cultivated from such hairs. Other microorganisms, so far as known, cannot produce trichorrhæxis nodosa. Regular shaving, epilation, and the application of parasiticide ointments are demanded.

New Treatment for Fibromata and Verruæ by Electrolysis.

—G. T. Jackson³ exhibited to the American Dermatologic Association an instrument he had devised. In removing small fibromata or warty growths with acids, if too much acid is used, there is apt to be a bad scar. Salicylic acid removes them, but is slow. He had formerly used an ordinary needle with electrolysis; but lately he had employed a fine knife, such as is used in ophthalmic surgery, and had had it removed from the handle and fitted into a needle-holder. It was passed under the base of the growth, a current of 3 or 4 ma. turned on, and with a little pressure on the knife the growth was amputated without loss of blood, little or no scarring resulting.

Potassium Bichromate in Warts.—Louvel-Dulongpré⁴ recommends this remedy for warts, both in man and in the domestic animals. It is painless and leaves no scar. The warts should be painted once a day with a saturated solution in boiling water. When the solution cools a certain amount of bichromate is precipitated. This should be discarded and the liquid applied cold.

¹ Arch. f. Derm. u. Syph., Band xxxviii., Heft 1.

³ St. Louis M. and S. Jour., July, 1897.

² Ibid., Band xii., Heft 1.

⁴ Treatment, vol. i., No. 15, p. 356.

Ichthyosis Treated by Thyroid Extract.—W. Walton Don¹ confirms the good effects which have been recorded in ichthyosis from the use of thyroid extract. Its remedial effect in skin-diseases is attributed to increased cutaneous vascularity, which stimulates dermal nutrition. It probably proves beneficial in ichthyosis apart from increased perspiration. He used Burroughs & Wellcome's 5 gr. tabloids, commencing with 1 tabloid, and after 3 or 4 days increasing to 3 or 5 daily. In the beginning of the treatment he prescribed a cardiac tonic of nux vomica and digitalis. In both cases of ichthyosis there was a tendency of the disease to return. Don directs attention to the increased pulse-rate produced by the larger doses, the tendency to the exhaustion of latent cardiac energy, and to the depression of the nervous system. Its administration should always be carefully watched.

Acanthosis Nigricans, or Papillary and Pigmentary Dystrophy.

—This rare and peculiar disease has received considerable attention in literature of late; thus P. Couillard² considers this disease of the skin in its relations with abdominal carcinoma, and concludes that the skin-lesions constitute a syndrome dependent upon abdominal carcinoma, characterized clinically: 1. By a papillary hypertrophy and pigmentation of the skin, possessing an essentially regional character. 2. By a papillary hypertrophy of the mucous membrane. 3. By a dystrophy of the hair and nails. 4. By absence of desquamation. 5. By the existence of a cachexia. Pathologically there exists carcinomatous degeneration in the abdominal organs; while histologically there are found hypertrophic and pigmentary lesions in the mucous layer of the epidermis and in the corium.

C. Boeck³ reports a case occurring in a woman, aged 52, operated on 3 years before for cancer of the breast. The skin, through papillary hypertrophy, was verrucous and pigmented, especially on the face, trunk, and extremities, the interscapular, umbilical, and genitoanal regions being particularly affected, while the tongue and palate became the seat of papillomata. The author is of opinion that the use of extract of suprarenal prolonged the life of the patient.

Kuznitsky⁴ gives the notes of a case occurring in a woman aged 42, the disease first appearing in the right breast, and subsequently in the usual localities. Cancer of the breast developed and was operated on; but the woman died of pleurisy. The autopsy, made by Recklinghausen, showed atrophy and cancer of the liver. The skin showed marked infiltration of the corium with mast-cells; pigment irregularly distributed; papillary hypertrophy marked.

Leslie Roberts⁵ reports a case of **melanosis accompanied by moderate acanthosis**, but which seems to lack many of the symptoms of typical "acanthosis nigricans." The legs were intensely pigmented, and were slightly edematous and scaly; but clinically there was no papillary hypertrophy of the skin.

C. Rasch,⁶ under the title **cutaneous and vesical papillomatosis**, gives the notes of a case occurring in a man, aged 79, who was operated on for vesical disease, a papilloma of the wall of the bladder being found. He succumbed to the operation, and on the skin of the general surface were found about 20 fibromatous and papillomatous warty formations, some with telangiectasis.

V. Collan⁷ also records a case met with in a woman aged 41. The dis-

¹ Brit. Med. Jour., Nov. 6, 1897.

³ Norsk Mag. f. Læger., No. 3, 1897.

⁵ Brit. Jour. of Derm., May, 1897.

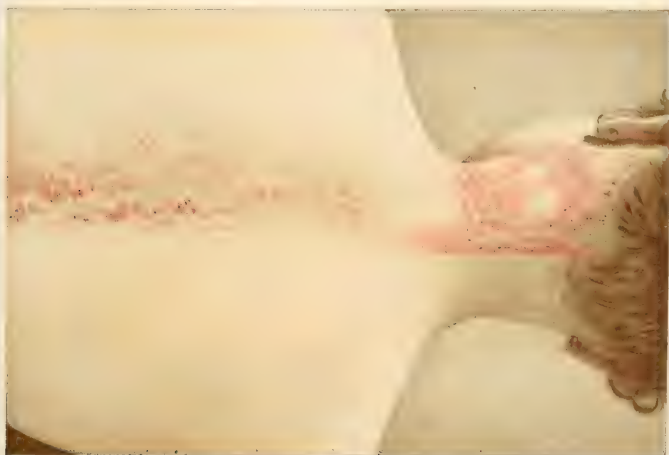
² Gaz. des Hôp., No. 42, 1897.

⁴ Arch. f. Derm. u. Syph., Band xxxv., S. 3.

⁶ Arch. f. Derm. u. Syph., Band xxxvi., S. 55.

⁷ Ann. de Derm. et de Syph.

PLATE 13.



ease began on the legs and thighs, after a long period of great pain in these parts. The borders of the eyelids, commissures of the mouth, vagina, palate, pharynx, gums, and nostrils were also the seat of the disease. The nails atrophied and the hair fell out, while the palms and soles showed thick, hard, and dry skin. From the clinical symptoms cancer of the stomach was diagnosed.

Two Cases of Linear Nevus.—Prince A. Morrow¹ reports 2 cases, gives valuable information as to the nature of the disease in general, and discusses the voluminous nomenclature, the latter state of affairs existing because no two cases are precisely alike. In almost all instances the cutaneous lesions occur in the form of streaks or bands following the long axis of a limb or transversely upon the trunk, but may be broken by interspaces of healthy skin. While in certain cases the lesions follow definite nerve-tracts, in others this does not obtain. The distribution is almost invariably unilateral; and in most cases the lesions are papillary or verrucous in character, but sometimes in the form of flattened, lichenoid, more or less scaly papules. The disease is of congenital origin, but may not appear until during adolescence. Sensory disturbances are often a notable symptom. The lesions may increase, remain stationary, spontaneously retrogress, or may undergo various degenerative changes—exceptionally a malignant transformation. (See Plate 13.)

NEOPLASMS (NEW FORMATIONS).

A Case of Pseudolupus Vulgaris Caused by a Blastomyces.—

T. Gilchrist and W. R. Stokes² report a rare, somewhat extensive cutaneous disease in a man 33 years of age (Plate 14). It first made its appearance 11½ years ago, at the back of the left ear, as a "pimple," which soon became pustular. The process slowly extended forward, and gradually covered almost the entire face, the central portion of which now presents an atrophic, cicatricial condition. One month after the primary invasion a similar lesion occurred on the back of the hand, which healed in about 4 years, after treatment with caustic; a third lesion, on the right side of the scrotum (6 months after), which increased in size for a year and then healed spontaneously; a fourth, on the anterior surface of the left thigh, grew for a year, after which it gradually healed spontaneously; a fifth, on the back of the neck, also healed spontaneously after growing for a year. The disease presented many of the features of lupus vulgaris. There were no enlarged lymphatic glands, and the patient's health had always been good. The family and personal history revealed no syphilitic or tuberculous taint. Sections from the cutaneous lesions showed the presence of what appeared to be budding blastomycetes. The organisms were chiefly spherical, unicellular bodies, varying from 10 to 20 μ in diameter, and consisted of a doubly contoured membrane, which enclosed a fine granular protoplasm, with sometimes a vacuole. Many budding-forms in various stages were found; no nucleus could be demonstrated, neither were any mycelium or hyphæ present in the tissues. The parasites were almost always found outside of cells, comparatively few being enclosed in giant cells. Pure cultures of the organism were obtained directly from the cutaneous lesions. The organism grew on all ordinary media. The cultures showed both budding-forms and a fairly profuse mycelium. The organisms in the cultures were round, ovoid, doubly contoured, refractive bodies, varying in size from about 10 to 20 μ in diameter. Dogs, a horse, a sheep, and guinea-pigs were successfully inoculated. Microscopically these nodules were of a chronic inflammatory nature, and contained numerous parasites identical in appearance with

¹ N. Y. Med. Jour., Jan. 1, 1898.

² Jour. Exper. Med., Jan., 1898.

those in the patient. In the tissues of none of the animals successfully inoculated was any mycelium found. Since the organisms did not ferment sugar and produced in cultures mycelium, they may either belong to the blastomycetes or to the oidia; but in conformity with prevailing nomenclature the parasite was regarded as a blastomycete. In closing, the authors state that it would be advisable to examine more carefully all tuberculous lesions of the skin, and especially those of tuberculosis verrucosa cutis, for the presence of blastomycetes. This can be readily and rapidly done by soaking unstained sections in ordinary liquor potassæ, when the organisms, if present, will stand out as doubly contoured refractive bodies.

Miliary Tuberculosis of the Skin and adjoining Mucous Membranes.—Kaposi¹ believes that miliary tuberculosis of the skin is a much more frequent affection than one would be led to suppose from the publications upon the subject, since he himself had seen 22 cases in his clinic and others in his private practice. Clinically it is a well-defined disease, to be distinguished from lupus and all other so-called tuberculous affections of the skin. It occurs almost entirely in individuals suffering from some other form of tuberculosis, usually of the respiratory tract; but by no means only in the last months of life of such persons or in acute miliary tuberculosis of internal organs, as has been asserted. Tuberculosis of the skin is very often associated with a like affection of the neighboring mucous membranes, primarily or consecutively. The prognosis is not absolutely unfavorable, since spontaneous healing may take place or it may follow appropriate local treatment.

Treatment of Tuberculous Processes with Pyrogallol.—Veiel,² as a result of considerable experience with this remedy, regards its use, in many cases, preferable to any surgical treatment, the only disadvantage being its long duration. The diseased parts are first destroyed by means of 10% pyrogallol-vaselin, which, spread upon lint, is applied for 3 to 5 days. The healing of the wound thus produced is allowed to take place under $\frac{1}{2}$ % to 2% pyrogallol-vaselin, which is strong enough to destroy lupus-tissue without hindering the formation of sound granulations.

Radical Treatment of Lupus.—Urban³ compares the treatment of lupus with that of cancer, and recommends extirpation of the disease in all cases in which this procedure is at all practicable. There exist inoperable cases, just as in carcinoma and sarcoma, especially those in which the disease is disseminated and superficial. Transplantation is recommended in suitable cases.

Treatment of Lupus by Injections of Calomel.—Dubois-Havenith,⁴ at a *séance* of the Société Française de Dermatologie et de Syphiligraphie, reported 14 cases of lupus treated by one of his former pupils, Asselbergs, by injections of calomel. The effect of these injections in almost all the cases was decided, being most marked when first employed, but growing weaker as the number was increased. A complete cure was obtained in several cases; in others a marked improvement was manifest. This treatment seemed to be especially useful in old tuberculoulcerative cases with deep infiltration.

Surgical Treatment of Lupus Vulgaris.—Popper⁵ describes at considerable length the surgical treatment of lupus as practised by Lang, and its results. In 34 cases treated the results as to permanent healing and cosmetic effects were completely satisfactory. After careful cleansing the diseased area is completely circumscribed by a superficial incision, in order to mark out the diseased parts. When the diseased tissues are likely to become indistinct

¹ Arch. f. Derm. u. Syph., Band xliii.

³ Monats. f. prakt. Derm., No. 9, 1898.

² Ibid., Band xlv.

⁴ Ann. de Derm. et de Syph., No. 12, 1897.

⁵ Derm. Zeits., Jan., 1897.

PLATE 14.



Pseudo-lupus vulgaris caused by a blastomyces (Gilchrist and Stokes).

through flow of blood or the use of local anesthesia, their limits are previously marked out with some sterilized anilin-dye. The incision is made about $1\frac{1}{2}$ to 1 cm. from the diseased area, which is removed entirely at one sitting when the local conditions permit. Especial care is taken to keep the operation-wound clean and to avoid contact with particles of lupus-tissue. Hemorrhage is carefully and completely checked, before the application of the grafts, by torsion, pressure, or, in exceptional cases, by the Paquelin cautery. The grafts are usually taken from the external surface of the thigh. For the first dressing dry, sterile gauze is used, fastened to the surrounding sound skin by means of collodion; and this dressing is allowed to remain for 4 or 5 days. A second dressing is then applied for another 4 or 5 days. After this period a 10% dermatol salve or iodoform-vaseline is used, changing it every second or third day. Usually after 8 days of salve-application the treatment may be regarded as completed.

Treatment of Lupus.—M. Sopicjko,¹ of Kieff, discusses this question at length, and concludes by stating: 1. That he rejects absolutely all treatment by medicines. 2. That palliative surgical treatment rarely gives a complete cure. 3. The operation should be radical, it being necessary to remove the entire thickness of the skin and of the subcutaneous cellular tissue, and to include at least 1 cm. of apparently sound skin. 4. It is only under these conditions and the operation thus performed that it can be considered radical.

Tuberculin in Dermatology.—A. Ravogli² states that from his personal experience tuberculin is a great help in dermatology, both as a diagnostic and as a therapeutic means; that in lupus erythematosus it acts remarkably well as a systemic treatment, but, of course, the locality must be treated with external applications; that in a large number of instances he never had any bad effects, and the condemning of tuberculin for fear of spreading tuberculosis is absurd. The "*old tuberculin*" has given more regular reaction, both general and local, than the "*new tuberculin*"; and thus far he has found in dermatologic work that the old is preferable to the new tuberculin. In cases in which no other remedy has any beneficial influence and the tuberculin causes disappearance of the eruption, healing of the ulcers, and improvement of the general condition, this remedy has to be acknowledged as a great one. If relapses occur after ceasing the use of tuberculin, the remedy must not be blamed. It must be used for a long time in small doses at long intervals.

The Tuberculin-R in Lupus Vulgaris.—Dontrelepon³ treated 15 cases of lupus, and of these nearly all had tuberculous glands and 3 tuberculous bone-disease. He regards the action of this new tuberculin more effective than the old. Ulcers were noted to cicatrize, and where normal tissue covered in the lupus-nodule cicatricial tissue rapidly developed in the diseased area. Enlarged glands became further swollen, and some even suppurated. The patients bore the injections well, and there was in no case a local abscess. The dose should be increased more slowly than recommended by Koch. Worner⁴ treated 4 cases of lupus among other tuberculous cases; 1 chronic case was nearly cured, and 2, operated on some time before the injections, had not relapsed. To avoid febrile reaction he recommends that the dose should be increased very slowly—about 0.002 or 0.005 mgm. every second day. Seeligman noted great improvement after 40 injections in the case of a woman with lupus of the nose (healed).

Six Cases of Lupus Vulgaris Treated with Koch's New Tuber-

¹ Rev. de la Tuberculose, July, 1897.

² Va. Med. Semi-monthly, Dec. 10, 1897.

³ Deutsch. med. Woch., Aug. 19, 1897; Brit. Med. Jour., Oct. 2, 1897.

⁴ Deutsch. med. Woch.

culin.—Morris and Whitfield¹ publish a paper giving the history of 6 cases treated with Koch's new tuberculin. Koch lays stress on the following points: Begin with a small dose ($\frac{1}{500}$ mgm.). Raise the dose as rapidly as possible, taking care not to excite constitutional reaction. Never give a second dose until the temperature has fallen to the normal point or near it. He thinks immunity commences one or two weeks after injection of the larger doses (0.5 to 1 mgm.). The authors in their cases noted: (1) A diminution of the surrounding halo of redness in those cases in which this had been present to a marked degree before the commencement of the treatment; in cases in which there were simply yellowish-brown nodules in a white scar the injections produced no visible effect at this stage. (2) The next change was a slight depression in the center of the nodules, leading to wrinkling and desquamation. Then there occurred (3) gradual healing of all ulcerated surfaces; and (4) slow subsidence of the previously persistent edema of the lips, ears, etc. In 2 cases actual disappearance of the characteristic lupus-nodules was observed; in others there was distinct shrinking of nodules with diminution in the scaling. Another marked effect of the injections was the softening and flattening of preexisting scars. In no case was there any sign of progress of the disease after treatment had been begun. There was at first little or no reaction. When the larger doses were given there was considerable febrile disturbance, sometimes with headache and pain in the limbs, and even some trouble in breathing, and a general feeling of depression, with broken sleep. Locally the erythema was generally increased, and the whole affected area, including even old-standing cicatricial tissue, was swollen; but the phenomena of reaction quickly disappeared, and the patients without exception described themselves as feeling better than they did before. In 2 cases the patients were going about, and only came to the hospital from time to time to have the treatment applied. On the whole, the authors find that the local effects of the new tuberculin in the cases of lupus vulgaris in which they tried it were uniformly good, in some cases distinctly brilliant. As far as can be judged at present, the injections do no harm whatever.

The Therapeutic Employment of Tuberculin-R.—Scheuber,² who has used tuberculin-R in more than 30 cases of cutaneous disease, chiefly lupus vulgaris, concludes as follows: In very rare cases injections of tuberculin fail to produce any reaction. In most cases reaction occurs at the place of injection and in the disease-foci. A general reaction can never be avoided with certainty, even with a repetition of the same dose. In the beginning of the injection-treatment improvement occurs, but never healing of the local affection. A dose of 20 mgm. is not sufficient to cause disappearance of the process, and even larger doses are not followed by final healing. In a series of cases in which the injection-treatment was carefully carried out, and in some in which operative removal of diseased tissue was practised because of recurrences, no immunity appeared. Treatment with the new tuberculin offers no essential advantages over the old tuberculin; and the complications observed make it advisable to watch carefully the cases so treated if one desires to avoid disagreeable surprises.

Salicin in Lupus Erythematosus.—Crocker,³ at a meeting of the Dermatologic Society of London, showed 2 cases of lupus erythematosus in which salicin had been administered in 15-gr. doses, *t. i. d.*, with excellent results, a cure occurring in one and great improvement in the other. The external treatment consisted in the application of a simple calamin lotion,

¹ Brit. Med. Jour., July 24, 1897.

² Arch. f. Derm. u. Syph., Band xlii.

³ Brit. Jour. of Derm., Jan., 1898.

painted on twice a day. In the case in which a cure resulted the treatment had been continued about 5 months; the second case had been under treatment for a shorter time. It was not claimed that salicin would cure every case, but that a good many were either cured or improved by this drug.

Malignant Papillary Dermatitis.—F. H. Wiggin and J. A. Fordyce¹ report a typical case (with colored portrait) occurring in a woman aged 50. The disease began on the nipple of the breast 7 years after the birth of her last child. It was a "small sore" at first; grew gradually, and discharged at intervals a clear, viscid fluid. There were occasional burning and tingling, but no pain. At the end of the 5 years of its duration it existed as an inflamed area 2 by 3 in. in extent, in the center of which the nipple was so retracted as to be hardly perceptible. It had a sharply defined border, and its surface presented a granular aspect and a bright-red color, slightly streaked with white. The underlying tissues were infiltrated; but no tumor could be felt in the breast. The breast was excised and the growth examined by Fordyce [a number of good photomicrographs accompany the article]. The morbid changes found in this disease may be briefly described as an inflammation of the papillary layer of the skin, leading to edema and vacuolation of the constituent cells of the epidermis, followed by their complete destruction in some places and their abnormal proliferation in others. The change in the epithelium of the lactiferous canals and glandular epithelium, which is also of a proliferative and degenerative nature, is secondary to the change in the surface-epithelium. The overdistention of the lactiferous canals by the proliferating epithelium, resulting in a malignant infection of the surrounding connective tissue, is the usual termination of the disease, as in the case reported. The chief point of interest in the case was the length of time the disease had existed prior to malignant infection—nearly 5 years. As is well known, the disease is particularly liable to be confounded with chronic eczema until the breast itself becomes involved.

Treatment of Epithelioma by Arsenical Solution.—Borde,² at a meeting of the Société de Médecine et de Chirurgie de Bordeaux, reported a case of epithelioma, in which recurrence had taken place after surgical interference, treated by painting the growth with Czerny's solution of arsenic. These applications were made every two days, and in a short time a cure had taken place. Davezac presented to the same society a patient, aged 83, who had an epithelioma of the nose for about 1 year, in whom recurrence had taken place after thorough treatment with the thermocautery. A cure was obtained by the application of Czerny's solution.

Monochloracetic Acid in the Treatment of Xanthoma.—McGuire³ reports the cure of several cases of xanthoma by applications of monochloracetic acid. These applications were free from pain, but were sometimes followed by considerable swelling, which, however, soon subsided. The acid should be applied only to a small surface at a time. It first turns the lesions white, but in a short time a dark crust appears, which should be allowed to separate spontaneously.

Leprosy.—At the first meeting of the International Leprosy Congress, held in Berlin in October, 1897, Neisser,⁴ while admitting that absolute proof that the leprosy-bacillus is the cause of the disease has not yet been attained—since all attempts at obtaining pure cultures of these bacilli and producing the disease in animals by inoculation of these cultures have failed—considers that the following facts justify us in assuming a causal relationship,

¹ N. Y. Med. Jour., Oct. 2, 1897.

² Ann. de Derm. et de Syph., No. 2, 1898.

³ Jour. Cutan. and Gen.-Urin. Dis., July, 1898.

⁴ Boston M. and S. Jour., Mar. 17, 1898.

with great certainty: 1. The absolute constancy of the presence of the bacilli in all cases of leprosy that are clinically indisputable. This is independent of the manner of living, nourishment, climate, race, age, or sex of the individual, or of the form of disease in the special case. 2. Every clinical symptom of the disease is to be explained by the assumption of a bacterial pathologic anatomic process. 3. The minute histologic appearances in the cells are dependent on the presence and peculiarities of the bacilli. 4. The bacilli differ from the bacilli found in all other diseases, not only in their reactions to staining-agents, but also in their failure to grow on artificial culture-media and in their innocuousness for animals. 5. These constant and characteristic bacilli are present in a disease which can only be explained on the supposition of an infectious material existing in lepers. The contagiousness, which is now fully proved, finds a further support in the numbers of bacilli which leave the body and afford opportunity for spreading the disease to other persons.

Keloid Following the Application of Iodin.—Thiebierge¹ reports the case of a girl of 15, who had applied to the skin of the anterior portion of the thorax a considerable quantity of tincture of iodine, which was repeated once, in order to relieve an attack of bronchitis. Seven months afterward a scar was present which presented a distinctly keloidal character.

Sarcomatosis Cutis.—Tomaso de Amici² states that sarcoma of the skin may be of metastatic or of primary origin. The primary form presents itself as a nonpigmentary, a melanotic, or multiple, idiopathic, hemorrhagic neoplasm. Primary melanotic sarcoma may appear anywhere upon the skin, but especially upon pigmented moles, and grows rapidly, especially when the knife is used. Any interference with it proves unsatisfactory. Histories of 2 cases of nonpigmented and melanotic sarcoma are given. The most important variety is the third—the multiple, idiopathic, pigmented sarcoma, of which the author has seen about 50 cases. Often all the extremities are simultaneously affected, and sometimes even symmetrically. It may last for a long period—even longer than 20 years—and may be occasionally temporarily improved by arsenic, but usually it ends fatally.

Multiple Cutaneous Sarcomata Cured by Injections of Arsenious Acid.—Niatle and Hébert³ report the case of a man of 32 years, with undoubted disseminated sarcomatous tumors of 18 months' duration, from a pea to a nut in size. The patient was given mercurial frictions, and took potassium iodid up to 2 gm. daily. The following preparation was injected into the center of each of the tumors twice weekly: Arsenious acid, 20 cgm.; cocain hydrochlorate, 1 gm.; boiled distilled water, 100 gm. The quantity injected at each operation was about 4 c.c. Rapid improvement ensued, but the patient declined to continue the mercurial and iodid treatment. The injections were continued 3 months. All the tumors had then disappeared, and had not reappeared 3 months later.

Removal of Embedded Powder-grains.—Edward Jackson⁴ says that success in extracting powder-grains depends upon whether the grains are superficially or deeply embedded. In the former case they will be thrown off with the epithelium and leave no disfigurement; while in the latter there will remain permanently in the tissue some portion of the powder, which will become gradually diffused and cause permanent disfigurement. Useless effort and time have been spent on "powder-grains," on the supposition that they were actually "grains" embedded in the tissue, and as such could be picked

¹ L'Abeille méd., Feb. 13, 1897.

² Monats. f. prakt. Derm., Band xxv., Heft 7, 1897.

³ Jour. de Méd. et de Chir. prat., Sept. 25, 1897.

⁴ Albany Med. Ann., Mar., 1898.

out. A powder—"grain" is a mechanical mixture of very finely pulverized charcoal, saltpeter, and sulphur. As soon as it becomes embedded and subject to the influence of the tissue-fluids the saltpeter—potassium nitrate—dissolves, the sulphur also shortly disappears, and there is left only the finely divided charcoal diffused through the tissue. At first this is massed in a small area of tissue, to which it gives the appearance of a black grain, capable of removal as a single mass. But even at this time it has become so incorporated with the tissue that its removal is impossible without the removal of certain portions of the tissue itself. In most cases a large part of the original disfigurement is due to the powder lodged on or in the epithelial layer, and this will be thrown off in a few days in any case. To favor its separation an old remedy, and one of the best, is poulticing; another is blistering; another the use of a strong spray directed upon the part. For deep stains the author always uses the galvanocautery, and in cases that are at all extensive he has found it necessary to employ general anesthesia. In those of moderate extent the local anesthesia of Schleich may suffice.

Albuminuric Dermatoses.—Merck¹ considers under this title those affections of the skin which are intimately associated with albuminuria. These are (a) a certain kind of eczema; (b) pruritus; (c) urticaria; (d) erythema; (e) furunculosis. Albuminuric eczema is a sharply circumscribed papular, chronic eczema occurring in persons of advanced age, having its most frequent seat on the leg, accompanied by intense itching, which resists all therapeutic endeavors for its relief, but which may completely disappear spontaneously with the formation of pigment. Albuminuric pruritus is the most frequent dermatosis accompanying Bright's disease, and is usually universal in its distribution. The course of the kidney-affection and the variations in the quantity of albumin contained in the urine are without influence upon the variations in the intensity of the itching. This form of pruritus is not distinguishable from other forms of pruritus, such as occur in diabetes, in pregnancy, or from indigestion. Urticaria is associated with albuminuria almost as frequently as pruritus, the former being often the forerunner of the latter. Erythema and erythema-like efflorescences are much less frequent in albuminuria than in pruritus and urticaria.

Disinfection and the Disinfecting-power of the Skin.—Roberto Binaghi² states that the human skin in a normal and in a pathologic condition presents a bacterial flora composed of schizomycetes, hyphomycetes, and blastomycetes. In the animals experimented on a large majority of the schizomycetes and some of the hyphomycetes were found to be pathogenic; but not the blastomycetes. Repeated general bathing, followed by friction with sterilized cloth of a rough texture, is considered the most practical means of disinfecting the cutaneous surface. In surgery the most energetic antiseptics in use for partial disinfection of the skin are corrosive sublimate, carbolic acid, and potassium permanganate. The use of disinfectants should be preceded by mechanical disinfection and softening of the superficial horny layers before removal of the oily matter with ether and alcohol. The skin of the human being exercises an attenuating and microbicidal action on various pathogenic microorganisms.

A Contribution to Bleeding Stigmata.—J. N. Hyde³ relates the history of several cases of this affection. The first was a well-developed

¹ Arch. f. Derm. u. Syph., Band xliii.

² Il Policlinico, Dec. 1, 1897; Indépendance méd., Mar. 2, 1898.

³ Jour. Cutan. and Gen.-Urin. Dis., Dec., 1897.

clergyman, 46 years of age, who had never been addicted to the use of tobacco or alcohol; no history of venereal disease nor of previous illness. During repairs to the house he imagined he had been poisoned by fresh paint. Shortly after, the scalp and face were the site of itching and pustulocrustaceous lesions. A diagnosis of dermatitis venenata was made, but the word "syphilis" had been on the lips of the physician who attended him, and his fear of this disease caused an exceedingly nervous condition, which lasted for two or more years and reduced his weight from 180 to 150 pounds. His subjective symptoms were chiefly nausea and inappetence. The sites of the hemorrhages were capriciously selected. The patient was placed upon a generous diet, and quinin and iron administered; rest and exercise were prescribed; constipation was relieved; and subsequently the health was gradually restored. The most significant factor in this result was the restoration of hope in the mind of the man himself.

Seborrhœa Nigricans; an Unusual Hysterical Disorder.—

J. K. Mitchell¹ gives the history of a woman, 24 years old, of Jewish parents, who had been fairly healthy until her sixteenth year, when a floating right kidney was found, which was anchored, after which there was decided improvement. When she was 19 years of age a series of deaths in her family greatly depressed her, and she began to have a return of the headaches which had affected her as a child, and at this time she first noticed a dark coloration on the lower lids of both eyes. From this date on she has never been in good health. She suffered from great debility, with cramps in the abdomen, apparently hysterical in character, and had semi-conscious attacks, with fixation of the eyes and loss of knowledge of her surroundings. The discoloration grew darker and became more extensive, and existed around both eyes, on both lids, above the eyebrows, on the forehead, and beyond the canthus on both temples, even reaching as low as the alae of the nose. The pigmentation is not increased by excitement nor by ordinary exercise, but is sometimes worse after an unusually painful menstrual period. If she is exhausted by fatigue the color becomes deeper and is more widespread. The eyes are weak, and frequently ache and burn, and she has a nervous cough. Respiration is almost always extremely rapid, sometimes as high as 50 or 60 a minute, a fact of which she is herself unaware. The urine on analysis is negative. Blood-examination and microscopic study of the blood reveal no abnormality. The discoloration is never so marked on the upper lids as on the lower. It is increased by extremes of heat and cold, and changes to a certain extent from day to day. It is not affected by pressure. On attempting to wipe it off, it gives to the cloth used in wiping a look of smuttiness, as if fine lead-pencil dust were upon it. It can be washed off only if force is used, but recurs in a few hours. After washing in this way the skin is found somewhat sensitive and a little flushed. It was proved that the manifestation was not artificial—that is, due to some application employed to deceive. The patient was under treatment for several months. The author thinks that this case had all its symptoms modified by the presence of a hysterical tendency. The menstrual functions were disturbed; she suffered from dyspepsia; she had several of the stigmata of hysteria, including that very distinct sign of hysterical disorder, rapid breathing. A. C. Abbott examined the matters from the discolored portion of the skin both microscopically and by bacteriologic methods, and failed to find anything to account for the diseased state of the skin.

¹ Phila. Med. Jour., Jan. 15, 1898.

THERAPEUTICS.

Lesions Apparently Tuberculous Cured by Antisymphilitic Treatment.—Alfred Fournier¹ brought forward this subject at a meeting of the French Society of Dermatology and Syphilology, the case being that of a man in whom a history of syphilis seemed to be excluded, and who had a history of general tuberculosis in addition to the cutaneous ulcerated granulomata. Under one injection of calomel subcutaneously there was improvement in the lesions of the skin, and under a few more injections he was nearly cured. Augagneur, of Lyons, confirmed the views suggested by Fournier, citing 2 similar cases. Jacquet also reported a case, that of a young woman recently confined, who, after puerperal fever, developed acute osteomyelitis of the left thigh so grave that Dujardin-Beaumetz thought of proposing amputation; but under Gibert's syrup the woman recovered completely. Fournier thinks that the moral to be drawn from such cases is that mercury and iodine cannot be regarded as reactive drugs during the existence of syphilis.

Best Form of Mercurial Inunction Cure.—Unna² calls attention to the fact that the use of "mercury-salve soaps" for the purpose of inunction is not new, as claimed by some, but has been employed by him uninterruptedly since 1884. The advantages of this form of inunction have been put forward in the work of Leistikow,³ based upon the treatment of 4000 cases. Unna considers that this method is more agreeable and convenient to patients than that of mercurial ointment, and that from the physician's standpoint it acts energetically upon all varieties of syphilitic lesions, and more rapidly than mercurial ointment. Further, that mercurial ointment is rubbed in satisfactorily only in subjects with a markedly fatty skin; while the "mercurial-ointment soap" is well adapted to all conditions, acting more energetically and surer upon deep-seated local lesions than mercurial ointment, and that it is particularly indicated in glandular swellings and bone-affections. The "gray soap" (*sapo cinereus*) recommended contains, as in the case of all "ointment-soaps," a cooked potash solution and fat, with 5% benzoated fat superadded to the body of the soap, with which is incorporated half its weight of quicksilver. For an active course of inunction about a dram is used daily; for a mild course from 15 to 30 gr. The application is allowed to remain on the skin about a week. It does not stain the linen appreciably.

Oil-rubbing in Dermatologic Practice.—H. S. Purdon⁴ directs attention to the value of the ancient plan of treating chronic diseases by this means. Rubbing with oil, to avoid fatigue, in the case of invalids should be done by another, and is especially useful for delicate children and young persons. The weight in a few weeks will be increased by several pounds. Good olive-oil and cacao-butter, perfumed with oil of bitter almond or bergamot, are recommended. Ichthyosis, pityriasis rubra, chronic squamous eczema, and scarlatina are especially benefited by such oils.

Value of Adeps Lanæ as an Ointment-base.—J. A. Cantrell⁵ states that: 1. It is almost colorless, as well as being entirely nonirritating. 2. It approaches nearer the normal color of the skin, being a pale amber. 3. It mixes freely with all drugs and absorbs large quantities of water, which enhances its value. It undoubtedly has greater penetrating qualities than any other known base.

¹ Méd. mod., May 22, 1897.² Monats. f. prakt. Derm., Jan. 15, 1898.³ Therap. d. Hautkrankh., Hamburg, 1897.⁴ Dublin Jour. Med. Sci., Jan., 1897.⁵ Jour. Cutan. and Gen.-Urin. Dis., Jan., 1898.

Salophen in Skin-diseases.—Wannemacker¹ has found salophen prompt and efficient in allaying the itching accompanying various skin-diseases. The ordinary amount to be given daily is a dram.

Calcium Sulphid as a Depilatory.—A. W. Brayton² recommends calcium sulphid as a depilatory, which he states is perfectly harmless to the skin and does not irritate abraded surfaces. He says that it "can be made by heating a granulated mixture of plaster-of-Paris (calcium sulphate) with granulated wood-charcoal (to take off the oxygen). A high temperature is necessary, and it is best obtained by means of gas. A muffler is used—*i. e.*, set in cinders or bone-ash, and the mixture is heated to redness. . . . The dry, rose-colored or whitish product is applied to the skin in a wetted condition, or it may be put on dry and then wetted." The author has made extensive use of it experimentally and otherwise on many occasions, and speaks highly of it.

Thiosavonal, a Soluble Sulphur-soap.—Müller and Grube³ speak well of this medicinal soap, which is prepared by saponifying Riedel's sulphur-oil with potash-lye and adding empyreumatic oil of birch. It is a soft soap, having no odor of sulphuretted hydrogen, is unirritating, and may be used with good results in cases for which sulphur is employed.

Treatment of Sweating Feet.—P. Richter⁴ recommends a solution of formaldehyd (1 tablespoonful to 1 quart of water), or the use of tannoform or tartaric acid, which can be used sparingly between the toes and in the socks. In the boots or shoes the formaldehyd solution given, or a 3% carbolic-acid solution, is allowed to remain for an hour, to be repeated, if necessary. On sweating hands Richter paints a 10% solution of chromic acid. The yellow coloring of the palm of the hand soon disappears; the painting is repeated about 10 times. A. Hoff, of Vienna, recommends tannoform in the following words: "It is especially valuable for marching troops. It is a remedy which will soon render soldiers with sore feet fit for duty."

Formol in Axillary and Palmar Hyperidrosis.—Unna⁵ recommends a salve containing 10 to 20 gm. of the commercial solution of formol combined with 30 gm. of lanolin or vaselin. It diminishes the amount of perspiration and abolishes the odor, but radical cures are extremely rare.

Ichthyol Ointment for Profuse Sweating of the Feet.—Unna⁶ speaks highly of the following formula for this condition: Ichthyol, 25 parts; water, 15 parts; lanolin, 25 parts.

SYPHILIS.

Chancre.—Audry⁷ reports a case in which 2 chancres occurred separately and successively in the same individual. A chancre appeared on the prepuce and healed in 10 days. Three weeks later a sore appeared upon the lip, having the characteristics of an initial lesion. It was at this time he was seen by the reporter. The patient had continued to have intercourse with the same woman. Evidently immunity had not been conferred by the first infection. Rey⁸ saw 13 simple chancres in the same patient, having been developed upon the lesions of scabies. They were scattered over the thighs, abdomen, and penis, inoculation having occurred through scratching. Mazet⁹ reports a case of chancre of the conjunctiva in which the diagnosis was confirmed later by the develop-

¹ Jour. de méd. de Paris, Sept. 19, 1898.

² Jour. Am. Med. Assoc., Apr. 16, 1898.

³ Monats. f. prakt. Derm., Band xxiii., Heft 7; Centralbl. f. Chir., Sept. 11, 1897.

⁴ Therap. Monats., S. 576, 1897.

⁵ Sem. méd., Feb. 23, 1898; Jour. Am. Med. Assoc., Apr. 2, 1898.

⁶ Gaz. hebdom. de Méd. et de Chir., Oct. 14, 1898.

⁷ Jour. des Mal. cutan. et Syph., Feb., 1897.

⁸ Ibid.

⁹ Ibid., Jan., 1897.

ment of eruption and adenopathy. In lesions of this kind contagion is conveyed by kissing, washing the eyes with saliva, by the finger from the genitals, etc. The lesion is usually single and presents the same characteristics as elsewhere. The preauricular ganglion is usually first involved. Treatment should be irritating—warm antiseptic washing, followed by iodoform, eucrophen, or yellow-oxid ointment. Audry,¹ who has met with 3 cases of mixed chancre out of 90 cases, thinks the clinical importance of this variety is not sufficiently recognized.

Syphilitic Pseudoneoplasms.—Martel² calls attention to the possibility of serious error in diagnosis in the case of tertiary pseudoneoplasms, which may present themselves without any of the classic symptoms of gumma. In illustration he reports 2 cases of ulcerating tumor of the leg in which a diagnosis of malignant disease was made, and in 1 of which the limb was about to be amputated. In both cases specific treatment was followed by healing of the ulcer and disappearance of the tumor.

Treatment of Syphilis.—Anthony³ prefers injections of calomel in certain cases, and follows Neisser in recommending subcutaneous instead of intramuscular injections, believing there is less danger of wounding a vein, with consequent embolism, in this latter method. These injections are recommended in iritis, lesions of the throat which have resisted other forms of treatment, gummata of the palate, lesions of the viscera of all kinds, periostitis, and rebellious eruptions upon the face. Contraindications are old age, the existence of Bright's disease, diabetes, alcoholism, or pregnancy. The dose employed is 0.05 gm. suspended in sterilized olive-oil, each dose being weighed separately and mixed with the oil at the time of administration. The injections should be made with a sterilized syringe, in the gluteal region, every 7 days, 5 injections being given in all. Treatment by the mouth should then be begun and continued for 2 months, when the hypodermic treatment may be resumed if necessary.

Gallois⁴ prefers the soluble salts of mercury, as being less likely to cause pain and abscess, which so frequently follow the use of the insoluble preparations. He has employed the soluble mercuric benzoate according to the following formula: Neutral mercury benzoate, 0.25 gm.; sodium chlorid, 0.06 gm.; cocain hydrochlorate, 0.06 gm.; distilled water, sterilized, 30 gm.; 1 gm. of this solution is to be injected daily for one month. It causes very little pain, and abscesses or other complications have not occurred. The solution is a stable one and may be kept for a long time.

Richard Kopper⁵ urges the hypodermic use of corrosive sublimate in large doses, according to the following formula: Corrosive sublimate, 5 parts; sodium chlorid, 5 parts; distilled water, 100 parts. The injections should be made into the gluteal region, not far from the anus, avoiding a locality which would interfere with sitting or walking. They should be made deeply into the muscles—1½ in.—taking care to inject the entire quantity before withdrawing the needle, so that none of the solution is left in the track of the needle, since this causes pain. The puncture should be closed with iodoform-collodion. In about one-fifth of the cases intramuscular infiltrations occur; but these disappear rapidly, and in no instance have abscesses occurred. The injections should be made at intervals of 5 to 8 days.

Technic of Mercurial Injections.—D'Aulnay and Eudlitz⁶ consider this method of giving mercury one of "special indications," having certain

¹ Jour. des Mal. cutan. et Syph., Feb., 1897. ² Ann. de Derm. et de Syph., Mar., 1898.

³ Chicago Med. Recorder, Oct., 1897.

⁴ L'Union Pharm., t. xxxviii.

⁵ Prag. med. Woch., 1898.

⁶ Jour. des Mal. cutan. et Syph., No 7, 1897.

advantages and objections. The advantages are cleanliness, exact dosage, and certainty of application. By this method untoward accidents to stomach or skin are avoided, absorption is better, and the treatment is more rapid and surer. Among the inconveniences are stomatitis, gastrointestinal disturbances, painfulness of the injections, and the occurrence of infiltrations and abscesses. The liquid injected should be chemically pure, filtered, and sterile; and the dose should be as small as possible. When insoluble salts are used these must be held in suspension, preferably in some vegetable oil. As these emulsions change quickly when exposed to the air, each dose should be recently prepared. Cocain should not be added, as it is incompatible. The dose must be regulated by the body-weight, the end sought, the intensity of the disease, and the resistance of the individual. The sites for injection of the soluble salts are intravenous, paravenous, subcutaneous, intramuscular, or subconjunctival; for the insoluble salts they are intramuscular, or subaponeurotic in the deltoid, interscapular or subscapular regions, or the buttocks, the last being the site most commonly chosen. The syringe should be a Pravaz with a platinoid tip, and must be thoroughly sterilized, as well as the skin. In intramuscular injections the needle should be entered its whole length, and the liquid slowly forced in. Upon withdrawing it the skin should be pinched up, so as to avoid leaving a drop of the fluid in its track and thus causing an abscess. After an injection the patient should be allowed to remain at rest for a short time, or the spot should be lightly massaged. The following (1) soluble and (2) insoluble formulæ for injection are recommended: (1) Hydrarg. bichlor., 0.005 gm.; sodii chlor., 0.01 gm.; aq., 1 gm. (2) Sublimed calomel, 0.05 gm.; sterilized oil of vaselin, 1 gm.

Zeissl¹ recommends that the treatment of syphilis be confined to the duration of symptoms—that is, that the treatment be symptomatic instead of chronic intermittent or continuous. He does not give mercury until the full development of secondary symptoms, and stops treatment when the symptoms have disappeared. When active manifestations of the disease are absent he gives neither mercury nor iodids. As an argument against treating the initial lesion, he states that the course of syphilis is no more favorable now than when all primary sores, hard and soft, were treated with mercury. Another reason is that large doses of mercury are necessary in the secondary stage if it has been used in the primary.

Schwimmer,² although he agrees that removal of the initial lesion only palliates and does not cure the disease, recommends that mercurial treatment be commenced before the appearance of secondary symptoms. Of 15 cases of severe early syphilis seen by him in the last 3 years, not 1 had been treated with mercury. He deprecates any reliance upon the severity of the primary symptoms as an indication of the subsequent course of the disease, and maintains that all cases should be subjected to the same medicinal treatment. Pointing out that the discovery of the bacterial origin of chancre and gonorrhea has not led to any improvement in the treatment of these disorders, he considers that the possibility of a bacterial cause for syphilis should not interfere with its empirical treatment. As to the duration of treatment, with which the question of permitting marriage is connected, the author relates 2 cases in which, after prolonged treatment and freedom from all evidences of the disease, patients were permitted to marry; the wives were not infected, and each had 2 healthy children. Nevertheless, 8 years after infection each developed further syphilitic trouble, in one case in the testicle, in the other in the peristomium. He concludes that the most prolonged treatment is no absolute pro-

¹ Wien. med. Presse, Nov. 21, 1897.

² Ibid., Heft 44, 1897.

tection against relapses. As such long treatment is very depressing physically and mentally, 2 years are long enough; but marriage is not to be sanctioned until the end of the third or fourth year.

Whitla,¹ in opening the discussion upon the treatment of syphilis in the Section of Dermatology at the sixty-fifth annual meeting of the British Medical Association, discussed the following points: 1. How are mercury and the iodids supposed to act? 2. When should mercurial treatment be commenced? Especially, should it be given in the primary stage? 3. The various methods for its routine administration and its dosage, and the length of time necessary for mercurial treatment. 4. The treatment of tertiary symptoms and congenital syphilis. The lethal action of the soluble salts of mercury upon minute forms of life will almost certainly be found to be the explanation of the curative action of this drug in the secondary stage of syphilis. In whatever form administered, it enters the blood and there destroys the syphilitic poison, acting as a vital antidote. Another point which has been overlooked is that the syphilitic virus is a vital antidote to mercury. In this will be found the key to the difficulty of dosage, duration of treatment, and other puzzling questions. So long as the living virus remains in the blood and tissues of the patient the mercury will spend its force upon it without injury to the patient. When the syphilitic virus is exhausted or destroyed, then the mercury will begin to act deleteriously. The action of the iodids is less simple. It is generally taken for granted that they do not act as germicides, but upon the cell-growth characteristic of the disease. It is not safe, however, to assume that they exert no germicidal action in syphilis, since it has been demonstrated by Binz that they are decomposed by living protoplasm, setting iodine free in the tissues. As to the period when treatment should be commenced, mercury should not be given actively until the induration is such as to make it certain that we are dealing with the primary stage of true syphilis. The author has convinced himself that it is possible to suppress secondary symptoms by the administration of mercury as soon as the state of the sore permits a diagnosis, as advocated by Hutchinson. As to the manner of carrying out the treatment, it should be as continuous as possible for at least 9 months after the appearance of the eruption; and it should be the aim of the medical attendant to get as much mercury into the patient's blood as possible without producing injury to his tissues or organs. The notion that the condition of the gums is a test for dosage is a fallacious one. The teeth, mouth, and gums should be put into a healthy state prior to treatment, and maintained so throughout the mercurial course by the use of astringent and carbolic washes. The syphilitic phenomena afford a better indication for dosage than the mouth. If these remain uninfluenced or insufficiently influenced, the mercury may be pushed fearlessly. When these have disappeared the body-weight affords the best of all guides. There is little or no danger of injuring the patient by mercury as long as he gains in weight and is not markedly anemic. The duration of the mercurial course must be decided by the results. After 9 months of continuous treatment the patient may have complete rest for 2 or 3 months, if no trace of the disease be present. A mild mercurial course combined with the iodids should then be given every alternate 6 weeks for 9 months more. Finally a 3 months' course of fair doses of the iodids should complete a 2 years' course. In all grave attacks of the disease, in all cases in which time has already been lost, in nearly all cases of cerebral and spinal syphilis, in syphilis appearing under certain conditions after marriage, and in malignant syphilis treatment by inunctions should be insisted upon. The iodids are of little or no use in the beginning

¹ Brit. Med. Jour., Nov. 6, 1897.

of the secondary stage. When, however, symptoms appear in this stage which are usually considered as belonging to the tertiary period, the iodids should be combined with the mercury. Another indication for the administration of the iodids at an early stage is marked elevation of temperature, since it effectually depresses the temperature in the eruptive stage. The iodids may also be given after the termination of a 6 or 9 months' mercurial course. In the tertiary stage treatment should be commenced with large doses of the iodids. Lesions which resist ordinary doses given regularly may disappear rapidly if the dose is markedly increased.

Choice of Method of Employing Mercury in Syphilis.—Fournier¹ rejects as antiquated fumigation, baths, mercurial plasters, and methods of a similar character, and employs 1 of the 3 following methods: Ingestion; inunction; hypodermic injections. The advantages of the first are ease of administration; tolerance by the gastrointestinal tract; and proved activity. The disadvantages of administration by the mouth are occasional disturbances of digestion; limitation to moderate doses, large ones causing diarrhea and stomatitis; consequent suitability for such cases only as do not require speedy action. The advantages of inunction are marked activity; absence of digestive disturbances; does not interfere with the administration of other remedies by the mouth. The disadvantages are trouble and length of time required; difficulty of concealing the treatment; variability of curative effect, depending probably upon the manner in which it is carried out; liability to occasion stomatitis. Hypodermic injections may be used in one of two ways—viz., frequent or daily injections, and occasional injections. The first method presents the following advantages: It is active and easily regulated; it is not attended by digestive trouble; it leaves the stomach free for the administration of other medicines. On the other hand, it is painful and often accompanied by local complications, and it is in most instances impossible to carry out the treatment with regularity outside of a hospital. Occasional injections are remarkably active, sometimes producing curative results not seen in any other method. The chief objection to these injections is the unavoidable pain produced. Notwithstanding the painfulness of this method, the author believes it should not be given up, since it is very valuable in exceptional cases when a rapid effect is important or other treatment has failed. The author concludes: If the patient is robust, ingestion will probably be the most suitable method; but if he is dyspeptic or cachectic, one of the other plans must be selected. If the teeth are bad, the best treatment is the perchlorid by the mouth. Injections are to be used only when actually necessary. Mild cases of syphilis should be treated by ingestion, severe cases by inunction, and the worst ones by hypodermic injections.

Double Sodium and Mercury Hyposulphite in Syphilis.—A. Miceli² has successfully employed hypodermic injections of a solution containing 1 gm. of double hyposulphite of mercury and sodium to each c.c., the ordinary dose. This is equivalent to 9 mgm. of metallic mercury. The injections were only slightly, if at all, painful, and no secondary effects were noticed in 15 cases so treated, while the therapeutic effects were prompt.

Treatment of Syphilis by Hypodermic Injections.—J. Grünfeld³ believes that this method is superior to all others in the treatment of constitutional syphilis in ambulant patients. Deep intramuscular injections of large single doses are not followed by complications or unpleasant results. While the position of this method is satisfactory, it does not produce the rapid cura-

¹ Sem. méd., June 30, 1897.

² Ibid., Feb. 2, 1898.

³ Centrallbl. f. d. gesammte Therap., Heft 12, 1896.

tive effect of inunctions. The following formula is preferred: Corrosive mercuric chlorid, 1.25 parts; sodium chlorid, 3 parts; distilled water, 50 parts.

Treatment of Syphilis with Serum of Mercurialized Animals.

—Tarnowsky and Jakowler¹ report the results of their experiments. Three colts were injected with from 4 to 6 gm. of calomel in the course of 2½ months. Sixteen cases of syphilis in various stages were treated with serum obtained from these animals, injections of 10–20 c.c. being made in the gluteal region. The average number of injections was 17. No effect upon the disease was noted in any case; on the contrary, ill effects, such as anemia, pyrexia, joint- and muscular-pains, and albuminuria resulted. The authors accordingly conclude that treatment of syphilis with mercurialized serum is contraindicated.

Neisser² believes that the results produced by **inunctions of blue ointment** in the treatment of syphilis are due, not to the comparatively small amount of mercury which actually passes through the skin, but to the inhalation of mercurial vapor which the warmth of the patient's body causes to be constantly given off. He therefore advises that the patients spend as much time as possible in a single, well-warmed room, taking as little exercise outdoors as is compatible with health, in order that they may be constantly surrounded by an atmosphere charged with mercurial vapor. His method of treatment is to apply 4 gm. of a 33½% or 50% ointment at bedtime or on rising, without friction, increasing the quantity by 1 gm. every tenth application, and continuing the treatment 42 days. If astringent and antiseptic mouth-washes are plentifully used, stomatitis and salivation should never occur; although a mild degree of either does not necessitate, in most cases, the suspension of the treatment for any length of time.

Metallic Iodin in Syphilis.—Bouveyron³ advises in grave syphilis which has resisted mixed treatment or been insufficiently modified by it, the use of metallic iodine in large doses, up to 15 gm. a day. He employs the following formula: Iodin, 1 gm.; potassium iodid, q. s. ut ft. sol.; glycerin, 10 gm.; citric acid, 15 gm.; syrup, 1000 gm. Of this, 2 tablespoonfuls a day may be taken; to be afterward increased to 9. In order to prevent the combination of the iodine with alimentary substances, each dose ought to be taken one-half hour before meals.

The Action of Potassium Iodid on the Blood of Syphilitics.—

Colombini and Gerulli⁴ state that potassium iodid given by the stomach in the early stages of syphilis produces an increase of red corpuscles and hemoglobin. If the administration is continued there is sometimes a diminution of the red corpuscles, followed by a progressive and continuous increase; but the increase may be continuous and uninterrupted from the first. When the iodid is suspended the red corpuscles and hemoglobin at first tend to decrease; but afterward again increase. Simultaneously there is a marked and continuous increase of the body-weight. The authors believe that the beneficial results of treatment depend upon a specific action of the iodid upon the syphilitic virus, and that potassium iodid in moderate doses is the best remedy for the chloranemia of syphilis. Control-experiments on the blood of healthy subjects showed that potassium iodid produced a constant diminution of the red corpuscles and hemoglobin. The white corpuscles were apparently unaffected. There was likewise a decrease in the weight of the body, especially if the dose of the iodid was progressively increased.

Changes in the Blood Produced by Syphilis.—Justus⁵ finds that

¹ Sem. méd., Aug. 25, 1897. ² Volkmann's Sammlung klin. Vortr., Heft 199, Dec., 1897.

³ Gaz. hebdom. de Mécl. et de Chir., Apr. 3, 1898.

⁴ Brit. Med. Jour., June 26, 1897.

⁵ Brit. Jour. of Derm., Feb. and Mar., 1897.

syphilis untreated produces a diminution of the hemoglobin varying in extent according to the severity of the disease. As the syphilis undergoes spontaneous involution the loss of hemoglobin is gradually made up. A like diminution of hemoglobin occurs after the administration of mercury, varying according to the amount of the drug employed. The hemoglobin is restored sooner or later, but may sink again after repetition of the mercury; if treatment is continued, it finally reaches a higher level than before the mercurial treatment was begun. When the hemoglobin no longer diminishes after repetition of the drug, the syphilitic manifestations remit. This diminution is a specific phenomenon, not being observed in the blood of healthy persons nor in other diseases. This reaction is observed in early secondary and all subsequent stages, disappearing when the signs of syphilis remit and reappearing during every relapse.

Stages and Forms of Syphilis.—J. G. Adami¹ discusses this subject with special reference to the hepatic manifestations of the disease. He concludes: 1. That in some cases there may be an absence of the primary cutaneous or epithelial manifestations of syphilis. 2. That individuals may fail to present either primary or secondary symptoms that are recognizable, and yet eventually develop definite tertiary lesions of the disease. 3. That where the subject is relatively insusceptible, it is possible that the disease may be limited to the primary cutaneous manifestation not followed by secondary lesions. 4. That as with tuberculosis so with syphilis, the congenital form of the disease begins at what may be termed the secondary stage of the acquired disease—*i. e.*, the stage of general dissemination of the virus through the organism. The relationship between secondary and tertiary syphilis is discussed, and the point brought out that there exists a lack of sharp definition between the anatomic changes in early and late generalized syphilis, as shown by a study of the syphilitic liver. Concerning the liver of congenital syphilis, it may be said that all the changes met with are those which ordinarily are considered to characterize the tertiary rather than the secondary stage of the disease. In the liver of acquired syphilis it is interesting to note that, whether we are dealing with cases in which death has occurred within the first year of the disease or long afterward, the morbid changes are of the same order. The author believes, from a study of postmortem cases, that anatomically and histologically there is no valid distinction to be drawn between secondary and tertiary syphilis, and expresses the opinion that such a conclusion, while seeming to be at variance with clinical experience, is in reality, upon investigation, not found to be so.

Intracranial Syphilis.—Teissier and Roux² consider at length the differentiation of various forms of syphilitic brain-trouble, such as arteritis, meningitis, and gumma. In syphilitic arteritis the symptoms of malnutrition of the nervous tissue are well developed, the paralysis, when it appears, being commonly of the flaccid type, with loss of the reflexes; and hemiplegia, or more frequently monoplegia, with involvement of groups of muscles, occurs. The authors believe that these symptoms occurring in a nonhysterical and previously healthy person are pathognomonic. Headache is comparatively infrequent, is not produced by pressure or tapping the skull, and is diffuse. There may be numbness of a limb or formication as premonitory symptoms of paralysis. Optic neuritis and ocular palsies are rare, the latter arising from secondary lesions. The intelligence fails gradually as the result of impaired cerebral nutrition, and if any mental strain be present may rapidly give way. Transient aphasia is an important symptom, and is often associated with paral-

¹ Montreal Med. Jour., June, 1898.

² Arch. de Neurol., Jan. and Feb., 1898.

ysis of one side of the face and of the right arm. Very rarely, when the arteritis has resulted in thrombus with degenerative changes in the pyramidal tract, the paralysis is spastic instead of flaccid. When the virus attacks the meninges the symptoms are quite different—the paralyzes are spastic, the reflexes exaggerated, partial epileptiform attacks occur, and the muscles affected are more numerous than in arteritis. Headache is diffuse, constant, and very severe, and, unlike that in arteritis, is increased by pressure and tapping on the skull. Darting pains in the limbs, and areas of paresthesia, anesthesia, and hyperesthesia are present. These symptoms are not transient, as in arteritis, but are permanent. Optic neuritis, loss of pupillary reflex, and amaurosis, with occasional bitemporal hemianopsia, occur. The aphasia, which in arteritis is transient, is in meningitis more permanent. When the inflammation is acute and basilar, vomiting, paralysis of cranial nerves, and bulbar symptoms are present, and death occurs in coma. If the region affected be the convexity of the brain, delirium, convulsions, and hemiplegia or monoplegia, with coma, are present. When the inflammation is chronic the symptoms are the same, but are slower in appearing. In gumma of the brain choked disk is common and hallucinations unusual; focal paralysis occurs and the headache is usually localized. The temperature is very rarely elevated; while in meningitis it is often so.

Aneurysm and Syphilis.—Étienne,¹ in studying the *role* of syphilis in the genesis of aneurysm, considers these 3 principal points: Can aneurysm originate from syphilis? Does aneurysm originating from syphilis present any features which differentiate it from nonsyphilitic aneurysm? Is aneurysm originating from syphilis of syphilitic nature, or simply of syphilitic origin? Of 376 cases collected by the author, 70% presented a history of syphilitic infection; and he concludes that, as this proportion is much too large to be the result of mere coincidence, syphilis plays a considerable *role* in the production of aneurysm. In answer to the second question, attention is called to the fact that aneurysm occurring comparatively early in life is apt to be syphilitic. Jaecoud's statement that syphilitic aneurysm is apt to be multiple is also true; but the frequency of multiple aneurysm in syphilis is not notably greater than in nonsyphilitics. Histologically there is no appreciable difference between the syphilitic form and others. Specific treatment frequently fails; therefore no conclusion can be drawn as to the nature of the malady from the results of treatment. As to the nature of these aneurysms, they may be designated by the term introduced by Fournier, *parasyphilitic*.

Life-expectancy of Syphilitics.—Hyde,² in a paper read before the Society of Medical Examiners for Life Insurance of Chicago, concludes as follows: Inherited syphilis is one of the most fatal of all diseases, and under the most favorable circumstances nearly 90% of children born living subsequently die. Acquired infantile syphilis is very rare, is exceedingly manageable, and probably a large proportion of all infants survive. From 80% to 90% of all adult patients with acquired syphilis escape its gummatous complications. The percentage of those affected with gummatous syphilis who perish is not known; but it is doubtful if it exceeds 2% of those who suffer from gummatous complications. The expectancy of life is probably not affected by coincidence of syphilis with other diseases, and the prospect that a patient with acquired syphilis will ever have struma, tuberculosis, or cancer is exceedingly small. The tendency of untreated acquired syphilis in the adult is not toward a fatal issue, but rather toward physical degeneration and grave complications due to involvement of the nervous system and the bones. It is unfair to

¹ Ann. de Derm. et de Syph., Jan., 1897.

² Med. Exam., Apr., 1898.

charge an extra risk for the insurance of syphilitic applicants otherwise in sound health and insurable, as the extreme improbability of death from tuberculosis or cancer more than counterbalances any unfavorable longevity-prospects due to infection. If the syphilitic applicant for life insurance has a good family history, a sound constitution, excellent habits, and has reached, but not passed, a satisfactory age, his expectancy of life is probably that of other individuals in similar conditions without added risk from his specific disorder.

Syphilis and Pregnancy.—Murray¹ mentions as the chief pathologic changes occurring in the placenta increase of fibrous tissue and cell-infiltration into the villi, with degeneration of the epithelial covering of the latter. Syphilis in the pregnant woman, if acquired before pregnancy, presents nothing abnormal. If acquired from a primary sore in the father at the time of a fruitful coitus, the initial lesion appears earlier in the mother than usual and is more severe. When infection from a secondary lesion in the male occurs in the earlier months of pregnancy, it usually kills the child; if in the later months, the child is less affected. If both parents are syphilitic, the effect upon the child is worst of all. The method of treatment recommended is inunction. When the child is born it is best treated through the mother's milk by the administration of mercury to her. When the infant grows older mercurial ointment may be placed on the flannel binder.

When May a Syphilitic Marry?—Morel-Lavallee² collected 38 cases of syphilis in which infection occurred more than 5 years after the initial lesion. In all contagion arose from a secondary lesion. Tarnowski, in a paper read before the Dermatologic Congress held in London, reports that of 1000 cases of syphilis under observation for more than 5 years, all exhibited condylomatous lesions for 3 years and more, while that period was exceeded by 2 years in 802. 20% showed secondary symptoms after 5 years; and in 31 cases secondary lesions were noticed after 10 years. Therefore it should be the invariable rule to allow 5 years to elapse before permitting marriage; and even then it should not be allowed unless a year has passed since the disappearance of secondary symptoms in one not subject to recurrences of mucous patches or erosions of the tongue or lips.

¹ Med. News, June 19, 1897.

² Rev. de Therap. méd.-chir., Nov. 15, 1896.

MATERIA MEDICA, EXPERIMENTAL THERAPEUTICS, AND PHARMACOLOGY.

BY HENRY A. GRIFFIN, M. D., AND J. R. TILLINGHAST, JR., M. D.,
OF NEW YORK.

The progress of the past year in pharmacology has been a repetition of its predecessor in the character of its results, for the bulk of the remedial investigation throughout the world has been directed to a study of drugs already known rather than to an exploiting of novelties. It is true that we meet a considerable number of new claimants for favor; some of them, indeed, if we are to take them seriously, competent to accomplish the miraculous. So frequent is their appearance now that we have ceased to marvel at the "perfect substitutes for iodoform." It suffices to say of them this year that the crop is perhaps not so plenteous as in former years, but that it has, on the other hand, not been totally a failure. Antistreptococcic serum has so far proved a disappointment, and the many hopes placed upon it have failed of justification. It would seem that the preparation is potent often for good; but that we have as yet failed to grasp its scope, its limitations, and, above all, its technic. The serum as now prepared and used is a disappointment; but analogy would lead us rather to blame ourselves for this than to reject the *reason* for its use. Mescal button, which last year excited considerable attention, has during the past year failed to retain general interest. This is in accord with our expectation; and the power its alkaloid possesses for harm, as witnessed in Langstein's case, is no additional argument for its employment. Of formaldehyd, it is pleasant to record that its anticipated value has been largely sustained by a more intimate acquaintance. It is, indeed, not true that, as some enthusiasts would have us think, it will accomplish everything in antiseptics; but though we know more now of its limitations, we have learned to rate it as valuable in no ordinary degree when used within its proper field. Certain salts of bismuth and salts of silver are the chief medicinal novelties of the past year. Their use naturally is in the astringent and the antiseptic field, and much interest attaches to their study. The several salts receive due consideration in the body of the article. A pharmaceutical innovation, or more correctly a restoration, evidently of great merit is the use of acetic acid as a solvent of vegetable drugs. How valuable is this use is forcefully explained by Squibb, and we have therefore presented his views as set forth in *Ephemeris*. In conclusion, we cannot but again express satisfaction at the conservatism which characterizes the pharmacologic work of the present day. Time was when novelty and brilliant discovery appeared the goal of investigators; but now a more thorough and cautious spirit of experimenting appears to prevail, together with a disposition to know better the old remedies and to view with not intolerant skepticism drugs of recent birth.

Acetic acid bids fair to regain its place among pharmacopoeial solvents, if one may judge from the statements that have been made about it of late.

Remington¹ has undertaken to ascertain its value as compared with alcohol in extracting certain drugs, and was successful with *nux vomica*, *sanguinaria*, *kola*, *ipecaacuanha*, *squill*, *cinchona*, and *colchicum-seed*. He calls attention to the antiseptic power of this agent, and to the agreeable, slightly acid taste of many of its preparations, especially when prescribed in combination with syrups. It also possesses a possible advantage over alcohol in cases of the alcohol-habit. Squibb² also speaks very highly of the properties of acetous extracts. The drugs were found to be very completely exhausted and a thoroughly representative and permanent extract obtained, which contained a quantity of acetic acid small enough to be disregarded, though even this small residue could be driven off by the application of heat. This was true even in the case of drugs containing oleoresins, so that acetic acid may be regarded as an efficient substitute for alcohol in preparing both solid and fluid extracts. These are strong, uniform, mix readily with water without precipitation, and are much less costly than the extracts obtained by means of alcohol. It is also said that the active principles form salts with the acid which are incompatible with few of the more generally used preparations in prescriptions. These advantages are such as to make these extracts an extremely valuable class of remedial agents should further experience confirm their general applicability.

Airol has now been in use for about 2 years, and has gained considerable popularity as a substitute for iodoform. Chemically it is bismuth oxyiodogallate, or, practically, dermatol with the addition of iodine. It has been favorably commented on in a great variety of diseased conditions as well as in wounds. The best results seem to follow its use in superficial lesions, such as open wounds, ulcers and burns, and soft chancre; but in boils, carbuncles, paronychia, etc., it would seem from the many favorable reports to be a useful agent. Like most other antiseptics, it has been used in the treatment of acute and chronic gonorrhea, and with as much success as is customary. A 10% emulsion in glycerin is used as an injection. In intertrigo very favorable reports of its action are given. It seems to have been used with moderate success in gynecologic practice and in the eye; but clinical reports are not numerous. Airol has been given internally in diarrhea in doses of from 1 to 4 gr., but with apparently no greater success than with other preparations of bismuth. A curious report is that of Fornara,³ who used this remedy in an advanced case of leprosy. The powder was dusted on all ulcers and open abscesses, a 10% vaselin ointment was applied to the conjunctiva and to the skin of the entire body, and a 10% solution in glycerin (airol, 1 part; glycerin, 7 parts; distilled water, 2 parts) was injected wherever softening of the tissues had begun. In about 2 months the patient showed marked improvement, with no further ill effects than some discoloration of the gums and a certain amount of prostration when large doses were taken. The good effects of the treatment were undoubtedly aided by the use of tonics and massage; but the case is, nevertheless, a remarkable one.

The administration of airol is not always without unfortunate consequences, however, as the reports of Aemmer, Goldfarb, and Zelenski⁴ show. Aemmer injected about 1 oz. of a 10% emulsion of airol in olive-oil and glycerin into a tuberculous abscess, the result of disease of the hip-joint, from which the pus was evacuated just before injecting the emulsion. The patient soon began to complain of very severe burning pain at the site of injection. This was fol-

¹ Am. Jour. Med. Sci., July, 1897; from Am. Jour. Pharm., No. 3, 1897.

² Ephemeris, p. 1938, Jan., 1898.

³ Ephemeris, Jan., 1898; from Wien. med. Blätt., Band xx., S. 135.

⁴ Brit. Med. Jour., Sept. 11, 1897; from Sem. méd., Aug. 25, 1897.

lowed by headache and coryza. Sodium bicarbonate was administered and the symptoms subsided. Three days later the symptoms of poisoning by bismuth began to develop—fetid breath, swelling and severe burning pain of the mucous membrane of the mouth, with a bluish line on the gums and about the edge of the tongue. The tongue became heavily coated, and small ulcers appeared upon the buccal mucous membrane. The submaxillary glands became swollen and tender, and pressure upon the teeth caused pain. The urine was dark and loaded with urates, but contained no albumin. These symptoms became so troublesome that the abscess was opened and a small quantity of the emulsion which remained was removed, whereupon the symptoms disappeared, the discoloration of the mucous membrane remaining longest. It is believed that these toxic effects were aided by the solubility of airoil to some extent in glycerin. The other observers quoted also give instances of the poisonous effects of this drug, referring to the burning pain which it sometimes causes and to the appearance of a bullous eruption following its application in some instances. The preparation is one of undoubted value in proper cases; but its use requires care, particularly at the present time, when these unpleasant possibilities are just beginning to come to light.

Alsol (aluminum acetotartrate) is prepared by mixing 5 parts of basic aluminum acetate with 3 parts of tartaric acid and dissolving in a sufficient quantity of water. The solution is then evaporated to dryness, the residue redissolved in a small quantity of water and precipitated with alcohol. This precipitate is aluminum acetotartrate, or "alsol," so called, and forms a permanent solution with water part for part. It is recommended by Athenstaedt and Redeker¹ as a substitute for potassium chlorate, corrosive sublimate, and carbolic acid, particularly when used about the mouth and throat. Alsol occurs in the market in 50% solution; but for clinical use this is diluted to a $\frac{1}{2}$ –1% solution.

Ammonol.—Further experience seems to confirm the opinion already expressed (see YEAR-BOOK for 1898, p. 923) in regard to this preparation, although it is undoubtedly used by many careful practitioners. G. M. Beringer,² after calling attention to the fact that the formula given on the label, $C_6H_5NH_2$, is the generally accepted formula for *anilin*, goes on to make a detailed report of his very thorough analysis of ammonol. He concludes that its composition is represented by the following formula: Acetanilid, 10 gm.; sodium bicarbonate, 5 gm.; ammonium bicarbonate, 5 gm.; metanil-yellow (a dye), 0.005 gm. [It would therefore appear, to quote from Beringer, "that 'ammonol,' instead of being a new 'coal-tar derivative,' is merely an admixture of the well-known acetanilid, sodium bicarbonate, and ammonium carbonate."]

Anesin is a new synthetic compound put forward as a hypnotic and local anesthetic. It purports to be an aqueous solution of acetone-chloroform. As a hypnotic, 7 to 15 gr. may be given; it is said to resemble chloral in producing sleep. A 1% solution is used to produce local anesthesia, and is described as two to two and one-half times more powerful than a similar solution of cocaine hydrochlorate. The advantages claimed are that it does not irritate, is not poisonous, keeps well, and may be sterilized. Vamossy³ has investigated the action of anesin and collected a number of reports of its use. When applied to the tongue it gives the sensation of a foreign body at first;

¹ Am. Medico-Surg. Bull., June 10, 1898; from *Centralbl. f. d. gesammte Therap.*, Band xvi., Heft 13.

² *Ephemeris*, Jan., 1898; from *Am. Jour. Pharm.*, vol. lxi., p. 150.

³ *Brit. Med. Jour.*, Oct. 9, 1897; from *Deutsch. med. Woch.*, Sept. 2, 1897.

then anesthesia follows, which is limited to the site of application, for the diffusive power is slight. In the eye the solution renders the cornea anesthetic without the mydriatic effect of cocain. The duration of the anesthesia is also longer than that of cocain; but the fact that the action of anesin is confined to the tissues with which it comes in actual contact makes it less desirable for larger operations. Anesin produces anesthesia very quickly when applied to the pharynx, larynx, or nasal mucous membrane, without any unpleasant effects; but concentrated solutions of cocain are better in most cases. In minor operations it is a good substitute for cocain and is less dangerous. The author hopes that further investigation will confirm this favorable opinion. [The very limited application of anesin does not lead one to be very enthusiastic over the new preparation. This seems to be the general opinion, to judge from the scarcity of reports on the subject.]

Anitin is a substance that has been obtained by Helmers by treating a hydrocarbon which contains 10% of sulphur with concentrated sulphuric acid, neutralizing with ammonia, and then precipitating with alcohol. This precipitate when dried is a brownish-black, very hygroscopic powder, soluble in water in all proportions, and has the property of rendering soluble those insoluble products with which it combines, these combinations being then known as **anitols**. Anitin and its preparations, the anitols, especially those obtained from the aromatic group, phenols, cresols, ethereal oils, camphors, and iodine, have been studied by Löffler¹ with reference to their germicidal powers. He found that anitin killed the bacilli of anthrax and diphtheria, and streptococci only. He then used **metacresol-anitol**, a compound containing 40% of metacresol and 60% of anitin, which he considers is a rapid and efficient germicide for all pathogenic bacteria. A 1% solution of this preparation equals a 3% solution of carbolic acid as a germicide; while a 3% solution of metacresol-anitol kills all cultures almost totally in less than a minute. A 5% solution destroys virulent anthrax-spores in 36 hours. A 1-2% solution, which does not exert any injurious effect upon the tissues, he recommends for disinfection of the hands and wounds. Löffler reports 50 cases of ozena successfully treated with this solution; while a 3% solution caused a rapid abatement of diphtheritic processes that had been produced experimentally.

Antistreptococcic serum can hardly be said to have established its reputation as a therapeutic agent as yet, although many favorable reports of its effect have been published. Much that is conflicting in these reports would, no doubt, be eliminated if the serum could always be prepared in exactly the same way and used in uniform strength and dose. It would seem to be an established fact that the serum obtained from the horse by Marmorek's method, prepared without the use of antiseptics and kept at a proper temperature, is the most potent. The serum will not keep indefinitely, but should be used within a reasonable time. Only those cases in which the presence of the streptococcus is demonstrated should be considered as conclusive, and the serum should be given in sufficient dose—i. e., 10 to 30 c.c., according to the indications in the individual case.

G. W. Cox² makes an enthusiastic report, which he sums up as follows: "1. In Marmorek's serum we have a remedy of the greatest therapeutic value. 2. So far as is known, it is only applicable to streptococic infection, simple or mixed; hence it naturally follows that, 3. An early bacteriologic examination should be made in order to settle the question of diagnosis and

¹ Am. Medico-Surg. Bull., May 10, 1898; from Deutsch. med. Woch., Band xxiv., Heft 10, 1898.

² Jour. Am. Med. Assoc., Sept. 11, 1897.

point the treatment. 4. Its action upon the microbe is rapid and certain if given in adequate doses."

The serum has been used in **malignant endocarditis**; but the reports are by no means conclusive. Three cases are reported in the *Lancet* for 1897. In the first, described by A. E. W. Fox,¹ the diagnosis and the presence of streptococci were demonstrated at the autopsy. The serum seems to have had no beneficial effect whatever; in fact, its use seems rather to have hastened the fatal termination. In the other 2 cases, those of Pearse² and Washbourn,³ no bacteriologic examination was made, so that, although the patients made good recoveries, the evidence is not conclusive.

In **scarlatina** no reports have been forthcoming in which the course of the disease seems to have been modified by the use of antistreptococcic serum.

It is in the treatment of **puerperal fever** that the most satisfactory results seem to have been obtained, and bacteriologic examination seems also to be more frequently made, perhaps because the technic is simple in such cases. Haultain⁴ reports 2 cases in which cultures showed streptococci and in which the serum was used. In the first the infection was complicated by the presence of *Bacillus coli*. The serum seemed powerless against the mixed infection, and the patient died a week after the onset of the symptoms. The second case was a simple streptococcus-infection, and yielded readily to the serum combined with the ordinary treatment by antiseptic douches. It is, of course, an open question whether recovery would not have taken place had the serum not been employed; but improvement is said to have been more marked after this treatment was begun. Steele⁵ tabulates all cases reported during 1896. The most important deduction seems to be that the cases in which the serum was injected early did better than those in which its use was delayed.

The use of antistreptococcic serum as a prophylactic in operations where infection with streptococci is feared, as in operations about the mouth and joints and in some laparotomies, has been advocated by several surgeons, notably by Watson Cheyne,⁶ who cites several cases in which he has adopted this procedure, and in which no infection followed. As one can never tell what might have been the result had the serum not been used, however, no definite conclusion can be reached except from the study of a large number of such cases accurately recorded.

Experiments are being reported with serums supposedly antagonistic to the poisons of various infectious diseases, notably tuberculosis, tetanus, and pneumonia; but much doubt still exists as to their real therapeutic value.

Anusol is the iodoresorein sulphonate of bismuth, and has been introduced as a remedy for hemorrhoids, as well as for catarrh, fissure, and pruritus of the rectum and vagina. Its rather descriptive name has so appealed to the humor of the medical profession that it has so far been the subject of very little serious comment.

Argonin.—To judge from the continued favorable reports, argonin has established a reputation for itself as a destroyer of the gonococcus, though the high price that still prevails considerably limits the application of the remedy. It is formed by a mixture of silver nitrate with sodium and casein, and is therefore one of the many organic combinations of silver that have flooded the market since Cr  d   suggested the idea. When argonin was first introduced it was believed by many that an agent had at last been found that would

¹ *Lancet*, vol. i., p. 520, 1897.

² *Ibid.*, p. 107.

³ *Brit. Med. Jour.*, Oct. 2, 1897.

⁴ *Ibid.*, vol. xi., p. 92, 1897.

⁵ *Ibid.*, June 26, 1897.

⁶ *Practitioner*, Apr., 1897.

"abort" gonorrhea. While it would appear from the reports of the past year that this idea has been given up, the verdict is very general that the remedy is a most valuable one in the treatment of acute and chronic gonorrhea and gonorrheal ophthalmia. Whether or not it is equally valuable in simple urethritis is a question upon which authorities differ. In 2% solution it is practically unirritating to the mucous membrane of the urethra, while this solution seems to be strong enough to limit decidedly the activity of the gonococcus, if it does not actually kill it, as is claimed by most authorities. The good effects of injections of this strength are said to be shown by a rapid diminution in the amount of discharge and a marked reduction in the number of gonococci found in the discharge. The solution is used as a hand-injection, as the drug is too costly to permit of irrigation. In gonorrheal ophthalmia the results are said to be equally good, and in both the urethra and conjunctiva the liability to complications is thus considerably diminished. The most careful studies of this preparation have been made by J. Judassohn,¹ of Breslau, and H. M. Christian,² of Philadelphia.

Bismutan, one of the latest of the bismuth compounds, is an odorless, rather sweet, bright-yellow powder, insoluble in water, and said to contain bismuth, resorcin, and tannic acid. Bion³ recommends it as a remedy for the diarrhea of children. He gives 1 to 3 gr. every 2 hours, in a mucilaginous medium, and claims that in 24 hours the vomiting and diarrhea disappear. No untoward effects have so far been noticed. To adults, 8 to 15 gr. may be given several times a day.

Bismuth maintains its popularity as an intestinal antiseptic, and its combinations multiply as rapidly as ever. R. W. Wilcox⁴ publishes the results of his study of the compounds of bismuth with phenol, naphthol, and tribromophenol. He considers them of much wider application than the subcarbonate and subnitrate, and of the three he finds the **naphtolate** the most useful. This preparation contains 80% bismuth oxid and 20% betanaphthol, and is decidedly antiseptic, being partly decomposed in the stomach and the process completed in the small intestine. The naphthol is mainly eliminated by the bowel, though a small part passes out by the kidneys; and the bismuth is eliminated entirely by the bowel in the form of a sulphid. Wilcox has used this preparation in intestinal putrefaction with very good results. In typhoid fever, when the cases have been taken in the first week or 10 days, they have, as a rule, been marked by low temperature and absence of pronounced abdominal symptoms, such as diarrhea, fetor, and tympanites. In those cases in which symptoms of general sepsis have supervened the remedies for this condition are, of course, indicated. Of **bismuth tribromophenolate**, Wilcox speaks less favorably, though extensive use has shown it to be similar to the naphtolate in application, and its sweetness and astringency are advantages. The phenolate was found chiefly useful in gastric fermentation; and although both these drugs were used in doses of 90 to 120 gr. a day, no toxic symptoms were noted. This fact the author ascribes to the slow liberation and absorption of the phenol. In the diarrhea of pulmonary tuberculosis the naphtolate was especially successful given in doses rapidly increased up to 1 or even 2 drams daily. The author further reports on 35 cases in which **eudoxin**, chemically known as bismuth tetraiodophenol phthaleinate, was used. This substance is an insoluble, odorless, tasteless powder, reddish-brown in color, containing 52.9% of iodine and 14.5% of bismuth. It is said not to be poisonous,

¹ Arch. f. Derm. u. Syph.

² Therap. Gaz.

³ Am. Medico-Surg. Bull., June 10, 1898; from Centralbl. f. d. gesammte Therap., Band xvi., Heft 3.

⁴ Med. News, July 31, 1897.

and in alkaline media decomposes into bismuth oxid and tetraiodophenol phthalein, the latter being dissolved in the intestinal contents. It has the advantage of smaller dose (5 to 8 gr., 3 times a day), and it is believed that the contained iodine may act favorably upon the intestinal glands. The 35 cases comprised in the report include chronic intestinal catarrh, intestinal fermentation, both simple and with pus-formation, exfoliative membranous enteritis, gastric and intestinal catarrh combined, and acute catarrhal duodenitis. In all these conditions the author speaks favorably of the remedy, though in one case iodine-acute developed. From his experience with all of the preparations he feels justified in the following conclusions: 1. That the use of the organic in place of the inorganic bismuth compounds should be insisted upon. 2. That the compounds of bismuth with betanaphthol, phenol, tribromophenol, and tetraiodophenol phthalein are remedies which produce practical intestinal antiseptics. 3. That they are indicated in all gastrointestinal fermentations and catarrhs until the symptoms are relieved, the dose to be determined by the severity of the symptoms. 4. That they are nontoxic and do not give rise to untoward symptoms.

Bismuth oxyiodopyrogallate is a new preparation of bismuth obtained by the prolonged digestion of bismuth oxyiodid with pyrogallol. It is described¹ as a fine, amorphous, yellowish-red powder, insoluble in water and the usual solvents. The advantages claimed for it are that it is unaffected by exposure to light and air and is not so readily decomposed by water as the other preparations of bismuth, while very powerful in its antiseptic action. Clinical data are wanting.

Captol is the name given by G. Eichhoff² to a condensation-product of tannin and chloral, which he describes as a dark-brown powder, hygroscopic and decomposed by alkalis, soluble with difficulty in cold water, but readily in warm water or alcohol. It is said to exert both the astringent properties of tannin and the antiparasitic action of chloral. Its chief use is in seborrhea, as a lotion for the hair. A 1% or 2% solution in alcohol may be applied twice a day, either as a prophylactic or as a remedy. It is said that in a week or two the scales disappear, the excessive secretion of the sebaceous glands becomes less, and the falling of the hair ceases. No ill effects are reported.

Carvacrol iodid is one more addition to the already long list of substitutes for iodoform. The advantages claimed are the usual ones: antiseptic power and lack of unpleasant odor. Carvacrol is an isomer of thymol; the so-called "iodid," as described by Cohn,³ is a bulky, amorphous powder, buff-colored and having a faint aromatic odor, is soluble in the organic solvents, and may be purified by precipitation from its solution in ether or chloroform by means of alcohol. It will bear high temperatures without decomposing. It is recommended in conditions that are considered to indicate the use of iodoform, such as wounds, sores, skin-diseases, etc.

Celandine (Chelidonium Majus).—The pharmacology of this herb and of one of its alkaloids, chelidonin (see p. 908), has attracted some notice of late, owing to the claim of Denissenko that it would cure carcinoma when given internally and injected locally, based upon its ancient repute in the removal of papillary outgrowths and upon his own experiments. This claim has been carefully investigated by many competent men, among them Sansom in England and Botkine in Russia. Shoemaker⁴ has recently carried out the treatment as directed by Denissenko in a considerable number of cases, and his

¹ Am. Medico-Surg. Bull., Mar. 25, 1898; from Pharm. Zeit., Band xlii., S. 787.

² Am. Jour. Med. Sci., Feb., 1898; from Deutsch. med. Woch., Heft 41, 1897.

³ Jour. Am. Med. Assoc., Sept. 4, 1897.

⁴ Ibid.

experience is the same as that of others. We quote his conclusions: "There is no doubt that the local application of the juice of *Chelidonium majus* will destroy certain nonmalignant hypertrophic lesions, as warts, corns, and callosities. It may also be serviceable in chronic eczema; in fact, in all hypertrophic conditions of the integument due to perverted nutrition or chronic inflammation. I am of the opinion, however, that it will be found destitute of influence upon the development of heterologous, malignant neoplasms." [An opinion based upon thorough investigation by a competent observer seems hardly to be offset by reports of single cases like that of Legrand.¹ While such reports should undoubtedly stimulate further investigation in a matter of such importance as the cure of carcinoma, we must confess that we view with great skepticism the efforts of those who would accomplish this end by means of internal medication. Both theory and practice (witness Chian turpentine and condurango) tend to discourage hopes of this character.]

Chelidonin.—The use of celandine in carcinoma is no new thing, but its alkaloid is a more recent therapeutic agent which has been offered as a substitute for morphin to relieve pain. The phosphate and sulphate of chelidonin occur in the form of colorless crystals, easily soluble in water. The tannate is a powder containing a little over 50% of the pure alkaloid, insoluble in water, but soluble in alcohol. These salts are said² to have given good results in pain due to ulcer and cancer of the stomach and in intestinal neuralgia, with none of the unpleasant effects that commonly follow the administration of opium, such as drowsiness and constipation. The dose advised is 3 gr. Guth,³ however, used doses of from 1 to 6 gr. on 6 cases of carcinoma of the stomach, 1 of locomotor ataxia, 1 of osteomalacia, and 1 of arthritis fungosa, with no result whatever in any instance. The value of the drug as a substitute for morphin is therefore questionable, to say the least.

Chinosol, another of the newer disinfectants, is the subject of many favorable reports. The drug occurs as a fine, crystalline, intensely yellow powder, with a fairly well-marked aromatic odor. Both its odor and color are imparted to solutions unless very dilute; but the solutions do not stain. The taste is rather sharp and astringent. Chemically, chinosol is said to be potassium oxyquinol in sulphonate, and the formula assigned is $C_9H_6NKSO_4$. Claims are put forth regarding its action as an antiseptic and bactericide, disinfectant, and deodorizer. One of the earlier experimenters with this agent was Bon-nema,⁴ who found it to be a protoplasmic poison, arresting the movements of amebæ almost instantly when in 1% solution. Solutions of half that strength required an hour and a half. It hinders the decomposition of meat and the conversion of albuminous substances into peptones. It also retards the coagulation of albumin and checks both alcoholic and lactic-acid fermentation. He found that a 5% solution acted as a bactericide, but that much weaker solutions (1:2000) prevented growth, and even 1:40,000 hindered it. The staphylococcus was used in these experiments. Corrosive sublimate produced precisely similar results; but it was found that 3 gm. of chinosol given by the mouth to a 2500 gm. rabbit produced no ill effects.

Chinosol is readily soluble in water, but not at all in ether or in absolute alcohol. Ostermann,⁵ of Hamburg, has made quite extensive use of this agent in gynecologic and obstetric practice. It may be conveniently carried in tablet-form. He finds it very useful in 1:500 and 1:1000 solutions in paren-

¹ Presse méd., May 28, 1898.

² Am. Medico-Surg. Bull., July 10, 1897.

³ Am. Jour. Med. Sci., Mar., 1898; from Therap. Monats., Heft 10, 1897.

⁴ Therap. Monats., Dec., 1896.

⁵ Am. Medico-Surg. Bull., Sept. 10, 1897; from Deutsch. med. Zeitung, Band xviii.

chymatous hemorrhages of the inner cervical surfaces and in lacerations of the vagina and perineum. These solutions are also useful as astringent vaginal douches in chronic infectious catarrh. Weak solutions are of value in the treatment of severe wounds after labor, preventing decomposition, and being at the same time safe, nonirritating, and odorless. A chinol solution gauze is recommended for packing abscess-cavities, such as Bartholinian abscess, after incision and cleansing. No bad effects are reported by this author.

In this country Klein¹ has carried out experiments to determine the strength of chinol solution necessary to exert germicidal action in 5 minutes, as he believes that a disinfectant to be of practical use must act in a reasonably short time. The bacteria chosen for these tests were *Staphylococcus pyogenes aureus*, *Bacillus coli communis*, and spores of anthrax. The two former were killed by a 1 : 150 solution; but the anthrax-spores required a 1% solution. This germicidal action is equal in the former instance to that of a 5% solution of carbolic acid; but the spores of anthrax are unaffected by this solution even after an exposure of 48 hours.

F. Hobday,² of the Royal Veterinary College of London, has made quite extensive use of chinol as a disinfectant and antiseptic in both the canine and the equine clinics. He obtained the best results with a solution of from $\frac{1}{2}$ to 1 gr. to the ounce, and prefers this solution to either creolin or lysol. Chinol may also be used as a dry dressing by diluting the powder with boric acid, zinc oxid, or powdered starch. Thus used, it compares favorably with iodoform. The undiluted powder, however, was extremely irritating, and turned the raw surfaces a brownish-black color. Solutions varying from 1 : 60 to 1 : 1000 were used to disinfect the hands, skin, and suture-materials, without producing any irritation; but for disinfecting instruments the results were not so gratifying. With a dilution of less than 1 : 1200 instruments lost their edge and the steel became covered with greenish-black spots that were very hard to remove. In some having white bone handles the bone became discolored and rough. The disinfectant solution acted also as a deodorizer for the hands and for fetid wounds. Hobday finds that the chief symptoms of poisoning are: "Sneezing and coughing; an increased flow of thick, ropy saliva; subnormal temperature; staggering gait, commencing with loss of motor power in the hind quarters; great prostration; and ultimately death from failure of the heart's action. The chief postmortem characteristic is the smell of chinol on or in some part of the body; another symptom to be looked for is the presence of frothy saliva in the pharynx, esophagus, or stomach." To what extent the conclusions of this author may be applied to human beings is, of course, an open question; but we quote those that seem to be of most value from this standpoint: (1) That chinol acts well as an antiseptic, disinfectant, and deodorant when used in certain proportions. (2) That its action is better when used as a lotion than when used as a powder. (3) That the powder is not suitable for use on fresh wounds unless diluted in some way. (4) That in disinfection of instruments care must be taken not to make the solution too concentrated. (5) That the drug possesses toxic properties. (6) That if used subcutaneously in too concentrated a form it will produce local irritation and swelling. The strength recommended for subcutaneous injection in human beings is from 1 : 600 to 1 : 200. [In chinol we are again called upon to hail the "ideal antiseptic." Doubtless the drug has advantages, and it may be that time will show its value to be exceptional. It appears to us, however, that some rather extravagant opinions have been put forth in its

¹ Treatment, Dec. 9, 1897.

² Brit. Med. Jour., June 4, 1898; from Jour. Compar. Path. and Therap., Mar., 1898.

advocacy, especially that of an English observer, who rates it an "antiseptic for everything." We hope that this enthusiasm may be well founded.]

Cocain hydriodate ($C_{17}H_{21}NO_4 \cdot H.I$) occurs in colorless crystals, slightly soluble in water. While by no means a new salt of cocain, it had not been used clinically until R. Marcus¹ recommended it to replace the hydrochlorate in causing anesthesia by the electric current in dentistry, because he found it better adapted for cataphoresis. He uses a 20% guaiacol-cocain solution, and states that after the application of this solution by means of a current ranging from 0.2 to 4 ma. for $7\frac{1}{2}$ minutes, complete anesthesia was produced in the tooth affected, lasting from 10 to 15 minutes, with no unpleasant after-effects. The guaiacol is said to act as a nonconductor, localizing the cocain solution and preventing too rapid absorption.

Cosaprin, the most recently introduced antipyretic, prepared in Basle, Switzerland, by Schwartz, is said to be a sulphoderivative of acetanilid. It is a light, grayish-white powder, amorphous, odorless, and of a slightly salty taste. It is readily soluble in water, giving a slightly acid reaction, the solution being colorless or pale yellow, according to the degree of concentration. The action of cosaprin has been studied by Vamossy and Fenyvessy,² who claim for it certain advantages: It is sufficiently soluble to permit of hypodermic use; it acts rapidly; it is less harmful than either acetanilid or phenacetin. These advantages are shared by the similar phenacetin-derivative, phesin. No further reports have as yet appeared.

Creosote continues to be widely used, and the chief objection to its use seems to be the difficulty in preventing derangement of digestion during administration. A variety of ways has been suggested to overcome this difficulty, chiefly by the use of emulsions or of capsules; but as yet none seems to be entirely satisfactory. A considerable number of those formulæ that have been found to be the most useful in this respect are given in Squibb's *Ephemeris* for 1898, and we quote a few of them for the benefit of our readers. An emulsion that has been recommended is: "Beechwood creosote, 48 to 126 minims; wintergreen-oil, 10 minims; acacia, 3 gm.; glycerin, 15 gm.; cod-liver oil up to 175 gm." Of this the dose for a child is a teaspoonful one hour after each meal. A formula recommended by Hock, of Vienna, "in the treatment of pulmonary tuberculosis in children" and "in the persistent catarrhal sequela following measles and whooping-cough" is as follows: Creosote, 1 gm.; cod-liver oil, 100 gm.; saccharin, 0.05 gm. The dose is from 2 teaspoonfuls to 2 tablespoonfuls daily, according to age. A formula recommended to be used in the form of wafers is thus prepared: "Beechwood creosote, 1 gm.; gum benzoin, 1 gm.; powd. veg. charcoal, 6 gm. Triturate the benzoin to a No. 80 powder with the creosote, adding the charcoal by degrees until the whole is uniformly triturated;" divide into 5 or 10 wafers. The "eresomagnesol" of Romeyer and Testevin is said to be made thus: "Caustic potassa, 20 parts; water, 10 parts; beechwood creosote, 800 parts; freshly calcined magnesia, 170 parts. The potassa is dissolved in the water and the creosote gradually added and made into an emulsion, after which the magnesia is intimately worked in. This mass darkens in color, and is allowed to stand 36 hours, when it is suitable for making into pills. Honey may be added to the mass later, when it becomes so hard that it can be powdered." For rectal administration the following mixture is recommended in doses of 30 drops to 2 teaspoonfuls daily in milk: "Eucalyptol, 5 gm.; tinct. benzoin, 25 gm.; balsam copaiba, 40 gm.; creosote, 12.5 gm.; sweet-almond oil, 17.5

¹ Am. Medico-Surg. Bull., Mar. 10, 1898; from Merck's Bericht, 1898.

² Therap. Monats., Aug., 1897.

gm." A formula is also given for the administration of creosote hypodermically, as follows: "Beechwood creosote, 25 gm.; camphor, 15.5 gm.; aristol, 9.5 gm.; eucalyptol, 30 gm.; sterilized neat's-foot oil up to 250 gm."

York Moore,¹ working in Jamaica, West Indies, claims to have had some success in malarial fevers by using creosote, as an antipyretic, with quinin. We quote a part of his communication: "I have frequently confirmed Surgeon-Lieutenant Rogers's statement that within 2 hours of the epidermic application of creosote the temperature drops very considerably, in some cases becoming normal in a few hours and showing no tendency to rise again; in others remaining at about 100° or 101° F.; or intermitting between this and normal. In this latter class of cases I have found that quinin administered by the rectum (commencing when the lowest temperature is reached after administration of creosote, which it is probably useless to repeat more than once during the same defervescence), in doses of 20 to 30 gr. at first, then 10 gr. every 3 or 4 hours, will speedily check the fever, usually, as has been previously pointed out, without causing any signs of cinchonism, and obviously without upsetting the digestion." The quinin was given in suppository or by "small enemata containing the quinin dissolved by the addition of just sufficient dilute sulphuric acid."

The various preparations of creosote, while most popular in the treatment of pulmonary tuberculosis, are also very well spoken of in pneumonia and bronchopneumonia, in various skin-affections, in diseases of the stomach and intestinal canal, and in gonorrhea. The **carbonate**, or **creosotal**, as it is called, has been used by von Leyden, in Berlin, in the treatment of phthisis, as reported by Nordt,² in doses of 5 drops 3 times a day, and increasing 3 drops daily until 25 drops 3 times a day were given. After from 1 to 4 weeks the dose was reduced and again increased. The night-sweats, fever, cough, and expectoration are said to have been diminished, and in 2 cases the physical signs in the lungs are said to have completely disappeared after from 8 to 10 months of treatment. No unfavorable effects on the digestive system were noticed. Paul Jacob³ makes an equally favorable report upon a series of 50 cases. All the symptoms are said to have improved, and even the phthisical diarrhea was favorably affected. No bad results are noted. Frank Woodbury⁴ reports on the creosote **valerianate** (eosote) (see YEAR-BOOK for 1898, p. 935) and of guaiacol (geosote) (see p. 917). Eosote is the valerianic-acid ester of cresol, and is a slightly yellow, oily liquid, soluble in alcohol, ether, and benzol, and having an aromatic odor. He prefers it to geosote only in gastric catarrh and in those conditions in which fermentation of the gastric contents occurs. He believes that the antiseptic action of eosote is greater and that it overcomes nausea, and with the aid of lavage favors a return to a healthy condition of the gastric mucous membrane, with consequent restoration of appetite and normal digestion.

Diethylketone, the hypnotic that was studied in 1892 by Albanese and Barabini, has been recently used by G. Noera⁵ to calm the periods of excitement in mania and hysteria and in melancholia with stupor. It may, perhaps, be remembered that the preparation is a mobile liquid which boils at 101° C., mixes with alcohol and ether, and is soluble to about 4% in water. The usual hypnotic dose is 7 to 8 gr.; but in cases of insanity it must be increased to 25 or even to 45 gr.

¹ Brit. Med. Jour., vol. i., p. 1332, 1897.

² Lancet, Dec. 4, 1897.

³ Am. Medico-Surg. Bull., Apr. 25, 1898; from Berlin. klin. Woch., No. 49, 1897.

⁴ N. Y. Med. Jour., Sept. 4, 1897.

⁵ Am. Medico-Surg. Bull., May 10, 1898; from Merck's Bericht, 1898.

Digitalis.—E. M. Houghton¹ has conducted a series of experiments upon animals in order to determine whether the fluid preparations of digitalis retained their activity when manufactured into tablets. He used the tablets made from a given preparation when fresh and when 2 years old, using the preparation, itself 2 years old, as a control. His experiments go to confirm the variable activity of our crude digitalis preparations, a fact only too well known; but he concludes that active fluid preparations of digitalis do not lose in activity by being manufactured into tablets, nor do the tablets become less active by keeping than do the other preparations of digitalis.

Digitoxin.—There has been an endeavor for some time past to obtain a substitute for the cumbersome infusion of digitalis that should have all of its therapeutic activity with as little as possible of its untoward effects (see YEAR-BOOK for 1898, p. 934). Probably the best of the many substitutes that have been offered is the crystallized digitoxin of Merck. This preparation has been used by Aubel and Masius, by Wenzel, and by Unverricht, all of whom find it rapid in its effects and without disagreeable symptoms, at the same time making it more easy to obtain accuracy of dosage. Von Starck² also reports a series of 14 cases in which he was favorably impressed by the action of this preparation. He used doses of about $\frac{1}{256}$ gr. twice daily, and in almost all cases obtained the desired result after giving 10 doses. In one case toxic symptoms followed the eighth dose, and in another 20 doses were taken in succession. The tablets were given by the mouth in all cases, and were well borne except in the one instance above referred to, in which the pulse fell to 46 per minute. In no case were the symptoms of gastric irritation sufficiently marked to necessitate any other method of administration. The crystallized digitoxin can be given, however, by rectum and hypodermically as well as by mouth, as is shown by the experiments of Unverricht.

Erythrol tetranitrate is obtained from erythrite, a tetratomic alcohol derived from erythrin. It is recommended for much the same indications as those met by nitroglycerin, and possesses the advantage of maintaining its action upon the blood-pressure for a considerably longer time. It may be used in angina pectoris, in conditions of cardiac pain, and in the increased arterial tension of chronic nephritis; but its higher cost and the readiness with which it forms explosive compounds⁴ would seem to offset any advantage it may have over the more commonly used members of this group, nitroglycerin and amyl nitrite.

Errhines as Expectorants.—Sir Dyce Duckworth³ calls attention to the value of sneezing as an aid to expectoration when the bronchial secretion is abundant, but the expulsive power is for any reason defective. Ordinary snuff may be used, or a combination containing 1 part of veratria to 20 parts of starch, lycopodium, or licorice-powder. This will usually produce effective sneezing followed by cough, with profuse expectoration. Other expectorants, such as ammonium carbonate, senega, nux vomica, or terebene, are also to be used; but the sneezing is said to act through the nasal branches of the fifth cranial nerve to stimulate the respiratory center in the medulla oblongata.

Euchinin.—Several reports have appeared in the past year corroborating the favorable results obtained by von Noorden with this remedy (see YEAR-BOOK for 1898, p. 935); but it has not yet become a popular drug in the treatment of malaria. In the hospitals of Milan it has been used, perhaps,

¹ Therap. Gaz., Apr. 15, 1898.

² Ibid., July 15, 1897; from Münch. med. Woch., Jan. 26, 1897.

³ Practitioner, Mar., 1898.

⁴ Brit. Med. Jour., Jan. 1, 1898.

more extensively than anywhere else, and the effects are said to have been most gratifying.¹ The general conclusion, so far, seems to be that euehinin is a satisfactory therapeutic agent in the treatment of all conditions in which quinin is indicated; that it has practically none of the disadvantages of quinin either in single dose or when used for a considerable period of time; and that it is effective in the same doses as the older drug, the large doses recommended by von Noorden being found of no advantage. M. Overlach² has made extensive use of euehinin as an antipyretic in pneumonia, pleurisy, pulmonary tuberculosis, influenza, typhoid fever, and erysipelas. He has also used it in neuralgia, in anemic conditions, and as an alterative. In a few instances ringing in the ears was observed, but this disappeared after the second or third dose and did not return. This he takes as evidence that the drug has no cumulative action, a fact of great importance, if true, but one that would seem to require further proof. In anemic states doses of $1\frac{1}{2}$ to $3\frac{1}{2}$ gr. daily caused no unpleasant effects even when continued for weeks at a time. The author states that there was a decided increase in the amount of hemoglobin and in the number of erythrocytes, and that the appetite and general condition were also improved. In neuralgia some remarkably good results are reported to have followed the use of occasional large doses, together with small daily doses continued for some time.

Formaldehyd has been the subject of a great many reports during the past year, and its reputation as a superficial antiseptic may be considered to be fairly well established, to judge from the favorable tone taken by nearly all observers. [Much confusion arises in the reports owing to the fact that it is often not made plain whether the gas *formaldehyd* or the aqueous solution, commercially known as *formalin* or *formal*, is meant. It is greatly to be hoped that future reports will be more clear on this point. As *formalin* contains only 40% of *formaldehyd*, the matter is one of importance.] The literature relative to the applications of this drug in surgical practice is too large for more than a passing reference. In this field it bids fair to supplant mercuric chlorid and carbolic acid in many of their uses. This is shown by the many enthusiastic reports of its action in abscess-cavities, sinuses, etc., where its ready diffusibility and tendency to harden the tissues with which it comes in contact render it an especially valuable agent. Again, in sterilizing urethral instruments it has received much favorable comment, both in solution, where its irritant properties make it necessary to wash away the formaldehyd with sterile water or salt solution before using the instruments, and in gaseous form. Edward Martin³ has devised a very efficient process, by placing the instruments in a box of any comparatively air-tight material, with a tray on which paraform (polymerized formaldehyd) may be spread, so as to permit fairly rapid vaporization.

By far the most important question that has arisen is in regard to the penetrating power of formaldehyd gas in room-disinfection and in the sterilization of dressings, etc. It will be remembered (see YEAR-BOOK for 1898, p. 938) that the early investigations were said to show that the gas possessed the power to permeate and to disinfect almost all organic substances to a considerable depth. The opposition that this statement has aroused during the past year is commensurate with the importance of the fact if proved. Har-

¹ Jour. Am. Med. Assoc., Feb. 19, 1898; from Gaz. degli Ospedali e delle Clin., No. 136, 1897.

² Am. Medico-Surg. Bull., Jan. 25, 1898; from Deutsch. med. Zeitung, Heft 15, 1897.

³ Am. Jour. Med. Sci., Apr., 1898; from Phila. Polyclinic, No. 6, 1898.

rington¹ has conducted a series of investigations with a view to test the following points: 1. The efficiency of formaldehyd as a general disinfectant. 2. Its penetrating power. 3. The amount necessary in a given air-space for the destruction of different microorganisms. 4. Its action on higher organisms. His experiments were conducted in two of the surgical operating-rooms and in the pathologic laboratory of the Boston City Hospital. The cultures employed were *Staphylococcus aureus*, typhoid, anthrax-spores, and a nonpathogenic, spore-bearing bacillus not yet identified. All cultures except the last-named were made on blood-serum or bouillon, and were 24 to 48 hours old. The spore-bearing bacillus-cultures were 4 to 10 days old. All tests were made on serum or bouillon, and were not considered negative until 72 hours had elapsed. The experiments need not be reviewed in detail; but some facts of interest were developed. The claim at first made, that formaldehyd gas was harmless to the higher organisms, soon found energetic opponents; and this opposition is supported by one of Harrington's experiments. Of 2 rabbits left in a room exposed to the gas, 1 was found dead on opening the room; the other revived, but died 36 hours later. Autopsy on the first rabbit showed great hyperemia and increased moisture of the respiratory passages and congestion of the lungs. In the second rabbit the same condition of the respiratory passages was found, with an irregular consolidation of about two-thirds of the right lung and about half the left, and with a little fluid in the pleural cavity. In both rabbits congestion and degeneration of the liver and kidneys were found; in short, the lesions were those that would naturally result from the action of a soluble chemical poison on the tissues. A number of experiments were made in a glass cabinet to find the amount of gas per 1000 cubic feet of space necessary to produce death of the exposed organisms. As a result of these experiments Harrington finds that: "Ordinary bacteria, and those of the highest resistance as well, when freely exposed to an atmosphere produced by vaporizing approximately 110 c.c. of formalin in each 1000 cubic feet of space, are killed within 2½ hours. An atmosphere produced by approximately 290 c.c. in each 1000 cubic feet will sterilize ordinary pathogenic bacteria, such as typhoid, *Staphylococcus aureus*, etc., within a half-hour, and anthrax in from 45 to 60 minutes, and will destroy typhoid bacilli protected by an envelope of cotton cloth in 1, *Staphylococcus aureus* (similarly protected) within 2, and anthrax (also in cotton) within 3 hours. An atmosphere of approximately 435 c.c. in each 1000 cubic feet, which would be in the proportion of about a quart to a room 15 feet square and 10 feet in height, will destroy all exposed organisms within a half hour, and others protected as above within an hour and a half." He further concludes that while formaldehyd has greater power than any known substance as a surface-disinfectant, it is not absolutely thorough in all cases. The penetrating power of the gas is considerable through dry, pervious substances, such as cotton cloth, absorbent cotton, hair, etc.; but the amount is not always sufficient to exert germicidal action. In the presence of moisture, however, the penetrating power is too little to be of practical value. Formaldehyd cannot, therefore, be considered as anything more than a surface-disinfectant, in spite of its power of penetration under favorable conditions.

G. W. Goler,² of the Rochester Health Department, reports a series of experiments to test the comparative value of formaldehyd and sulphur dioxide for room-disinfection; but the conclusion is not obvious, through lack of clearness, as to the distinction between formalin and formaldehyd. It is

¹ Am. Jour. Med. Sci., Jan., 1898.

² Med. Rec., Apr. 2, 1898.

therefore impossible to know the exact percentage of gas to air in the experiments quoted. Goler, however, evidently prefers sulphur dioxide.

Walter L. Bienen¹ states the result of what has evidently been a careful study of formaldehyd as a room-disinfectant. His conclusions are practically in agreement with those of Harrington—namely, that the power of the gas to disinfect is limited to superficial objects, owing to its lack of power to penetrate. He recognizes that something may be hoped for from a more perfect apparatus for generating the gas rapidly, and thus increasing the saturation of the atmosphere; but considers that, while ranking above sulphur dioxide, formaldehyd cannot yet compete with steam as a disinfectant either in penetrative power or rapidity of action in the sterilization of fomites. He refers to the fact that after disinfection of rooms by formaldehyd the atmosphere may be neutralized by the vapor of ammonia. He refers also to the change in color of fuchsin, under the action of this agent, to a violet or purple as a ready means of testing the extent of penetration of the gas. Instruments, he thinks, may be safely sterilized by it; but he doubts its power in the case of dressings, towels, etc.

Iwanoff² found that the livers of animals infected with anthrax and with fowl-cholera were disinfected only after prolonged exposure (15 to 24 hours) to formaldehyd gas.

Regarding the method by which the gas may be generated, much remains to be desired in even the best apparatus yet devised, both as to cheapness and effectiveness. The simplest and least effective method is to place the desired quantity of formalin (40% solution of the gas) in a receiver with enough calcium chlorid to dry the gas as it is given off, and to apply heat to the receiver. The gas thus generated is led through a tube into the room or space to be disinfected by a small opening, such as the keyhole. Another apparatus consists of a copper reservoir, from which the solution (formalin) is allowed to flow slowly into a coil which is heated by a lamp. Here the gas is set free, and is conducted into the room as from the other apparatus. The best forms of lamp, however, seem to be those which use polymerized formaldehyd in the form of powder or tablet. This is converted into the gas by the application of heat, and the pure formaldehyd thus formed is led into the room, or the lamp is allowed to stand uncovered in the room after having been lighted. By this apparatus the gas is more rapidly generated than by any other, a great advantage in procuring a high degree of saturation of the atmosphere.

Regarding the physiologic action of formaldehyd, the work of Benedicenti³ stands almost alone. He concludes that it is a blood-poison similar in action to hydroxylamin and phenylhydrazin; when added to the blood outside the body it produces hematin without the preliminary change of oxyhemoglobin to reduced hemoglobin, at the same time destroying the corpuscles. When introduced into the body the symptoms are excitement followed by slow asphyxia. Benedicenti discourages its use in surgery, as he considers it liable to cause sloughing; but in this opinion he differs with most observers. He has further investigated the combination of formaldehyd with protein substances. He believes that the union of the gas with gelatin is a true chemical union, of the type of urea and anilin, and this belief he supports by experiments. The compound, however, is not a stable one, being readily resolved into its components by steam distillation. Similar compounds are formed

¹ Jour. Am. Med. Assoc., Apr. 30, 1898.

² Practitioner, Mar., 1898; from *Centralbl. f. Bact.*, 1897.

³ Practitioner, Mar., 1898; *Arch. f. Physiol.*, Heft 3 and 4, S. 210, 1897.

with casein, albumin, and serum. Of the 4 compounds, he considers formaldehyd-albumin as the best for wound-treatment, for it can be so prepared as to contain any desired percentage of formaldehyd, though only a very small percentage is necessary to develop its antiseptic power. It occurs as a non-poisonous, white powder, whose disinfecting power varies with the amount of formaldehyd present, and may be used for the same indications as glutol (see YEAR-BOOK for 1898, p. 939). "Seroformalin," which is prepared from dried, coagulated blood-serum, was found to give rise to toxic symptoms in rabbits when used in the treatment of wounds. Its use is therefore not recommended, though the reasons for its toxic properties are not explained. The compound with casein acts much like the albumin-preparation, and the preparations have the advantages of cheapness, ready absorption, and lack of odor. The Chicago Department of Health¹ has recently dispensed with all apparatus in municipal disinfection with formaldehyd, and it is claimed that the results obtained are better than with the various forms of generator previously employed. A sheet of the ordinary size and quality is suspended in the room and sprayed with the commercial 40% solution of formaldehyd by means of a common garden watering-pot. It is found that this sheet will hold from 150 to 180 c.c. of this solution without dripping, and this is found to be enough to disinfect 1000 cubic feet of space. Tests were made in the usual manner with microorganisms in sealed envelopes and wrapped in sheets and in blankets, using both wet and dry cultures. After an exposure of 72 hours surface-disinfection is said to have been thoroughly accomplished, while the degree of penetration was greater than by the previous methods. Moreover, the evolution of the gas is much more rapid, so that in a few seconds the air of the room is not respirable, and the amount of paraform produced at the ordinary temperature is inconsiderable and remains in the meshes of the sheets. The latter fact is of considerable importance, for the reason that the room is again ready for occupancy in a comparatively short time after the sheets have been removed and the windows opened, because practically no paraform is precipitated upon the exposed surfaces to contaminate the air by its slow evaporation, as is the case where heat is used to evolve the gas. [If these facts should be supported by further observation, their importance is obvious, for it will greatly widen the sphere of usefulness of formaldehyd by bringing within the reach of the most inexperienced disinfectors a cheap and, apparently, a most effective procedure. We have dwelt upon the question of the penetrating power of formaldehyd at considerable length, as we believe it to be one of the greatest importance. The fact that penetration seems to be more complete as the saturation of the atmosphere becomes greater gives ground for hope of better results with improved apparatus.]

Gaiethol, or **guethol** (for there seems to be authority for both spellings), is allied to guaiacol both in its therapeutic properties and in its chemical composition, but contains one more atom of carbon. It is an oily liquid, insoluble in either water or glycerin, but soluble in alcohol, ether, and chloroform. Upon exposure to cold it precipitates as colorless crystals, having a melting-point of 26° to 28° C. and boiling at 215° C. De Buck² used this remedy in 6 cases of pulmonary tuberculosis. The subjective symptoms were somewhat improved; but he does not consider gaiethol more active in this respect than creosote and guaiacol. The antipyretic properties, while well marked, are less than those of guaiacol; but as an analgesic this author speaks very highly of the new remedy. In neuritis and neuralgia its local

¹ Jour. Am. Med. Assoc., Apr. 23, 1898.

² Brit. Med. Jour., Nov. 27, 1897; from Belg. méd., No. 31, 1897.

application, by painting with a solution in chloroform, 50%, covered by a bandage to prevent evaporation, or used as an ointment with vaselin to 6 times its weight, he found exceedingly useful. A 10% emulsion in glycerin or sterilized oil is recommended for hypodermic use, and is said to give immediate relief, which lasts for 3 to 4 hours. No local inflammation or necrosis occurred. Cases are also cited in which severe coxalgia and the tenesmus of a tuberculous cystitis were relieved by local applications of gaiethol. It is to be hoped that further clinical investigation will confirm these important statements.

Guaiacol now has an established reputation; but some new facts have been brought out about its use in the past year. As a local anesthetic it has been used for 2 years abroad in operations about the nose, throat, and ear. J. E. Newcomb¹ reports on his use of this agent to produce local anesthesia 36 times on 28 patients, 16 being men and 12 women. Either an alcoholic solution or a solution in oil may be used; the former has greater diffusive power, but the latter allows the guaiacol to remain longer in contact with the tissues, and is preferred by this author. The solution he recommends is prepared as follows: To a given weight of oil 10% of dried zinc sulphate (by weight) is added, and the mixture heated over a water-bath for an hour. It is then filtered, and 12½% of absolute alcohol (by weight) is introduced. It is shaken occasionally for a few days and then decanted. The result is a clear, limpid fluid with which guaiacol mixes readily. He has used this anesthetic in removal of nasal polypus, curetting ethmoid cells, removal of spurs of nasal septum by saw, cauterization of turbinates and of enlarged tonsils, curetting for granular pharyngitis, and uvulotomy. He thinks it in no way superior to cocaine; in oily solution it is more difficult to prepare and less pleasant to handle. The odor, moreover, is an objection at times; and its slow action, taking from 10 to 20 minutes to produce complete anesthesia, is a great drawback. It is also said to produce a sensation of burning and formication, and it does not retract the tissues. On the other hand, it possesses advantages in that it is absolutely safe so far as reported, produces no subsequent hyperemia, and is said to anesthetize the membrana tympani, a structure upon which cocaine has very little effect.

A new preparation for internal use, **guaiacol valerianate**, or **geosote**, as it is named by the manufacturers, has received some favorable comment, notably by Rieck,² of Bassum. He has treated 76 cases in all, including scrofulous conditions; pulmonary tuberculosis, both in early and advanced stages; tuberculosis of glands, bones, joints, and testicle; and general tuberculosis. The results as given are undoubtedly favorable; but whether more so than if some other preparation of guaiacol had been used is an open question. He says in recapitulation: 1. That valerianate of guaiacol is neither poisonous nor irritating, whether used internally or as a local application or hypodermically. 2. It is a good tonic in weak conditions, anemia, and chlorosis. 3. Having an especial action upon all mucous membranes, it is valuable in diseases of the stomach and intestines and of the respiratory tract. 4. It is especially a remedy for tuberculosis, whether given internally in pulmonary tuberculosis, externally in lupus, or as a local dressing, or by injection in bone- and joint-tuberculosis. In the latter case it must be brought into direct contact with the diseased tissue.

Frank Woodbury,³ in an article on the valerianates of cresol (see p. 911) and of guaiacol, describes the latter as the valerianic-acid ester of guaiacol,

¹ N. Y. Med. Jour., Aug. 28, 1897.

² Deutsch. med. Zeitung., Aug., 1897.

³ N. Y. Med. Jour., Sept. 4, 1897.

resembling the analogous cresol compound in physical and chemical properties. Both are readily absorbed by the human system, and preserve the heart- and nerve- tonic effects of the valerianic acid. The author holds that this compound of guaiacol not only possesses the power to produce local anesthesia, as above referred to, but has, in addition, a very marked antiseptic action. It thus, in his hands, used in the form of small compresses wet with the guaiacol valerianate, relieved pain and checked pus-formation in painful skin-affections attended by hyperemia. He has also used it locally with good results in acute and chronic rhinitis and in ulcerative conditions of the upper air-passages. For internal use Woodbury advises doses of 10 to 30 minims daily, given in milk in dilute alcohol, or best in capsules. In gastric disturbances with fermentation the cresol compound is preferred, as having a more decided antiseptic action; but in those cases of pulmonary tuberculosis that have come under his observation he corroborates the statements of Rieck.

Wendt,¹ the original experimenter with this preparation, bears out the statement that its administration is followed by no digestive disturbances. On the contrary, he speaks highly of the remedy in acute gastric and intestinal catarrhs, in doses of 9 gr. daily in the former, and 17 to 25 gr. in the latter. He also reports favorably on its action in relieving the cough, expectoration, and night-sweats of pulmonary tuberculosis, and in improving the general condition of the patient. The combination of guaiacol with piperidin is referred to elsewhere (see p. 927).

A **phosphite** and a **phosphate** of guaiacol have also been prepared. Of these, the former has received little attention; and the latter has fared scarcely better, if we except the report of Gilbert,² who describes guaiacol phosphate as "a crystalline body, without color, smell, or taste. It is soluble in strong alcohol; but insoluble in water, glycerin, and oils. It melts at 97° C. The proportion of guaiacol which it contains is 89.4%." According to this authority, the salt is not decomposed in the stomach, but is acted upon by the intestinal fluids, absorbed from the intestine, and eliminated chiefly in the urine. It is said to be as active as guaiacol and creosote, and has the advantage of being less poisonous. It is also regarded as an advantage by Gilbert that the phosphoric-acid radical enters into the composition of the salt, instead of the inert carbonic-acid radical, as in the carbonate. On the other hand, he admits that the high melting-point and insolubility in oil are disadvantages, for they render it impracticable to give this preparation by interstitial injection, by suppositories or enemata, or by the epidermic method. He has, however, given it in cachet, in daily doses of 40 to 60 cgm., to phthisical patients, with satisfactory results.

Holocain, the new local anesthetic that received so much favorable comment last year, seems to have been little spoken of since. Its poisonous properties and the consequent limitation of its usefulness may perhaps account for this, for the preparation seemed a valuable aid in the surgery of the eye.

Hydrargyrol, or para-phenyl-thionate of mercury, is a new antiseptic described by Gautrelet,³ containing both mercury and phenol, and to it he assigns the formula $C_6H_4.OH.SO_3Hg$. It occurs in brownish-red scales having an odor like ginger-bread, of neutral reaction, and specific gravity 1.850. It is insoluble in absolute alcohol; but with water and glycerin it forms solutions of a beautiful ruby-red color. These solutions are unaffected by metals of the

¹ Am. Medico-Surg. Bull., Sept. 10, 1897; from Deutsch. med. Zeitung, Band xvii., S. 1075.

² Med. Week, vol. v., p. 104.

³ Am. Medico-Surg. Bull., Apr. 10, 1898; from Nouveaux Remèdes, vol. xiii.

iron-group; but acetic acid and alcohol, even when dilute, decompose them. With the ordinary reagents for carbolic acid and mercury neither precipitates nor color-reactions occur. The solutions are not irritant, nor do they precipitate albumin, and on this is based the claim for the superiority of hydrargyrol over corrosive sublimate. On the other hand, alkaloids and basic toxins are said to be precipitated by the new preparation, and in growing cultures it precipitates the alkali-toxins. In the proportion of 1:250 it completely sterilized certain bouillon-cultures; while experiments on animals showed it to be 75 times less poisonous than corrosive sublimate. Reports of its clinical use are not yet forthcoming. [Hydrargyrol would appear to possess many valuable properties, and we await clinical reports upon its use with much interest. If it shall be proved to have the attributes described when used clinically, its value is self-evident apart from the very obvious delight attendant upon the use of an antiseptic whose odor resembles that of ginger-bread.]

Ichthalbin.—Many and various have been the attempts made to disguise the taste and odor of ichthyol, so as to permit of its internal use. The latest and apparently the most successful is that of Vieth, recommended by Arnold Sack,¹ of Heidelberg, who has succeeded in combining the active principle of ichthyol, sulphoichthyolic acid, with albumin. This acid forms 53% of ichthyol, while the new preparation contains 40%. Four grains of ichthalbin, as it is called, should therefore equal in therapeutic value 3 gr. of ichthyol. Ichthalbin is prepared by mixing a solution of ichthyol with white of egg, washing the resulting precipitate with alcohol, then with water, and finally drying. The result is a grayish-brown powder, with no odor, almost tasteless, insoluble in acids, but readily decomposed by alkalies. Artificial digestion seems to show that this preparation passes unchanged through the stomach and is broken up in the small intestine into sodium sulphoichthyolate and peptone. Thus the cruetation and nausea that so often follow the administration of ichthyol are reduced to a minimum, while the slow decomposition (4 to 6 hours) allows absorption to be very complete. Sack reports 30 cases successfully treated, including rachitis, anemia, tuberculosis, syphilis, and a variety of intestinal disturbances. Ichthalbin is said to be quite harmless, and may be given to adults in doses of 15 to 30 gr. 3 times a day before meals. For children the dose should not exceed 15 gr. If the powder remains too long in the mouth it is decomposed by the alkaline saliva, and the disagreeable taste of ichthyol results. Especially good results were obtained from fairly large doses (1 dram per day) in rosacea. In general, the results in all conditions were: Regulation of the bowels, the dejections becoming softer and greater in amount; increase of appetite, patients suffering from malnutrition and anorexia soon exhibiting a desire for food, and frequently developing excessive hunger; and improved nutrition, patients gaining in weight 1 pound per week on an average. Tests of the antiseptic power of ichthalbin were made, and seem to prove its ability at least to limit decidedly the ammoniacal fermentation of urine. For external application ichthyol will probably be found as useful as the newer preparation, at least in a majority of cases; but the latter is said to have proved of value in fissure of the anus and in relieving the itching of hemorrhoids. Further clinical reports will be of interest, and, if we may judge from the popularity of ichthyol, they will not be lacking.

Iodoformogen, a preparation of iodoform and albumin introduced by Kromayer,² is described as a fine, brownish-yellow powder, insoluble in water,

¹ Am. Medico-Surg. Bull., Sept. 25, 1897; from Therap. Beil. d. Deutsch. med. Woch., Band xxii., S. 35.

² Brit. Med. Jour., Apr. 16, 1898; from Berlin. klin. Woch., Mar. 7, 1898.

and with no tendency to become lumpy. It is very dry and is said to be $2\frac{1}{2}$ times more bulky than iodoform. Iodoformogen contains, in addition to iodoform and albumin, small quantities of albumin iodid and traces of free iodin. Kromayer, however, considers this as rather advantageous than otherwise, for iodoform acts only by the products of its decomposition when in contact with cellular tissues, while the decomposition preexists to some degree in the newer preparation. The gradual liberation of the iodoform from its combination with the albumin should also, he thinks, make its action more sustained; but the main advantage that is claimed for this powder is its freedom from unpleasant odor. A faint acidulous odor there is; but even this is not perceptible through ordinary dressings. In over 100 cases in which the author used iodoformogen as a dressing the results were entirely satisfactory and showed in a marked degree the characteristic action of iodoform in stimulating cell-growth; but it evidently retains some of the disadvantages of iodoform, as shown by the appearance of an eczema at times. The powder may be sterilized at 100°C .

Iodogallicin is a little-known compound of bismuth oxyiodid with methyl-gallicin, similar in chemical composition and action to airol. It is described as a light, amorphous, dark-gray powder, insoluble in water as the ordinary organic solvents, but decomposed into its constituent parts by acids and alkalies and by the long-continued action of water. It is said to contain 23.6% of iodin and 38.4% of bismuth. No clinical reports have as yet been forthcoming.

Itrol (silver citrate) and its companion-product, silver lactate (**actol**), have been rarely mentioned of late. [They were brought forward chiefly for the treatment of gonorrhea, and while they have undoubtedly some antiseptic power, it does not appear that they are better than cheaper and more familiar preparations.]

Kryofin is another of the newer coal-tar products that has been attracting attention during the past year. It was first produced by Bischer, of Zurich, in 1895, and it is claimed that in its action the untoward effects of the other coal-tar antipyretics are not seen, a claim more often made than fulfilled. Chemically, kryofin is an example of the synthetic drugs, being a condensation-product from π -phenetidin and methyl-glycolic acid. It resembles phenacetin in being a derivative of π -phenetidin. In physical properties it bears a resemblance to its predecessors, being a white crystalline powder with a melting-point of 208.4° to 210.2°F ., without smell, and soluble in 52 parts of boiling or 600 parts of cold water, in alcohol, ether, chloroform, and in fixed oils. In weak solutions or in small doses it is without taste; but in large doses an after-taste is noticed, bitter, and described as being like that of willow-bark. The most extended observation of the effects of the drug thus far reported is from Eichhorst's¹ clinic, at Zurich. In addition to the report of Eichhorst himself, Baek² gives an analysis of the results obtained. The doses used were 4 to $7\frac{1}{2}$ gr., administered in wafers. Of the 11 cases of typhoid fever reported, none showed bad effects from the kryofin, and in nearly all the temperature was reduced temporarily. In a few cases perspiration was noted, but is not said to have been excessive. In pneumonia, erysipelas, pulmonary tuberculosis, and several other febrile diseases, kryofin was used with equally good results. Its effects were compared with those of phenacetin and lactophenin in many of the cases, and were adjudged to be more favorable. Collateral and untoward symptoms are said to have been rare; in 1 case, after 15 gr. of kryofin, cyanosis occurred. The blood-pressure

¹ Deutsch. med. Woch., Apr. 22, 1897.

² New Eng. Med. Monthly, May, 1898.

is said to have risen as the temperature fell in most cases. In sciatic and in multiple alcoholic neuritis the analgesic effect was believed to be greater than that of other drugs. Biesler,¹ at Freiburg, has used kryofin in a number of cases of epidemic influenza, but with results apparently no better than those usually obtained with phenacetin. Haas and Morrison² thus summarize the result of 4 months' use at the Mt. Sinai Hospital, in New York, in the treatment of febrile conditions of considerable variety, pain, and insomnia: "As an antipyretic, while not reducing the temperature so rapidly or so markedly as the other coal-tar products, it is certainly very efficacious, at the same time being a safer remedy than the other members of the group, and its diaphoretic action being much less marked. As an analgesic, it is at least equal to the other members of the group, with the advantage that it is sometimes effectual where the others have failed. As a hypnotic, **when insomnia is due to causes other than severe pain**, it is of decided value, and probably superior to the other members of the group." [It will, we think, require further clinical evidence of the superiority of this drug over its predecessors before it can establish its reason for existence.]

Lactophenin still has its adherents, and many believe it to be a safer drug to use as an analgesic and antipyretic than is phenacetin. So far, 16 cases of severe jaundice following its use are on record (see YEAR-BOOK for 1898, pp. 932 and 942). Huber³ also reports a case in which 11 gr. were taken during the day. On the following morning an erythematous, patchy eruption appeared, with vesicles and ulcers on the mucous membrane of the mouth and on the labia minora, with intense itching of the vulva. Convalescence was not established for 8 days. [The symptoms reported by Huber, while very annoying both to patient and physician, occasionally follow the use of many of the antipyretic drugs whose usefulness and practical safety are unquestioned. (See YEAR-BOOK for 1898, p. 927.) The production of well-marked jaundice, however, is a more serious matter, and we must confess that it seems to us to call for a considerable degree of caution in the use of the drug which causes it.]

Largin is said to be a "combination of silver with a new organic compound resulting from the splitting up of one of the paranucleo-proteids." It is a light-gray powder, very light, and readily soluble in water, glycerin, blood-serum, albumin, alkali and acid albumins, and in solutions of peptone. It is not precipitated from watery solution by the chlorids, and is said to contain 11.1% of metallic silver. C. Pezzoli⁴ has investigated the effect of solutions of this agent upon the gonococcus. He finds that 1:4000 kills most of the cocci in 5 minutes, and that after an exposure of 10 minutes not one is left alive. It is therefore claimed that it excels the older preparations, protargol and argonin, in its efficacy in destroying the gonococcus. Its penetrating power, at least in dead tissues, is also said to be greater—clinical data are lacking.

Methyl Salicylate.—[In addition to its undoubted value in rheumatic conditions when given by the mouth, there seems to be a growing sentiment in favor of the application of methyl salicylate (synthetic oil of wintergreen) to the unbroken skin. It will be remembered that Lannois made a study of this method of medication and was most enthusiastic in its praise. He applied it on lint, which he wrapped about the joint, covering this with rubber tissue or oiled silk to prevent evaporation. He proved by an analysis of the urine

¹ Therap. Monats., Oct., 1897.

² N. Y. Med. Jour., Mar. 26, 1898.

³ Am. Jour. Med. Sci., Mar., 1898; from Correspondenzbl. f. Schw. Aertze, No. 24, 1897.

⁴ Am. Medico-Surg. Bull., May 10, 1898; from Wien. klin. Woch., Band xi.

that a considerable quantity of the drug was absorbed in this way, and contended that this was an actual cutaneous absorption, as against the view that the effects observed were due to inhalation of such oil as might get through the dressings.] Recently working with Linossier,¹ he again puts forth the claims of this method. These are still based upon the actual cutaneous absorption of methyl salicylate (the oil of wintergreen is not recommended), and the statement is made that saponification of the absorbed drug takes place in the blood, with formation of sodium salicylate, which is thus able to exert its usual action, together with some analgesic effect, without exciting any disturbance of digestion. Moreover, it seems to be a pretty well established fact that the toxic effects are rare and by no means intense, even when large doses are given and cutaneous irritation is practically absent. The diseases that have been treated with some success include acute and chronic rheumatism, in which the best results seem to have been obtained; gonorrheal rheumatism, which required large doses; infectious and gouty arthritis, neuralgia, and a number of other chronic painful conditions. It is found that less of the remedy is absorbed when an excipient is used; so the authors recommend that the pure salicylate be applied and evaporation prevented by a thick covering of rubber. The method has at least harmlessness to recommend it, and is worthy of a more extended trial. [Conclusions of a definite character are certainly not warranted by the small number of cases in which we have used oil of wintergreen thus. We have, however, been unable to satisfy ourselves that the very slight benefit sometimes obtained was greater than would be accounted for by the warmth and protection afforded by the material on which the oil was applied.]

Naftalan is a new ointment-base prepared from a crude naphtha peculiar to the Caucasus, which is said to differ from other naphthas in that it contains no resinous nor asphaltous substances. Naftalan spreads readily, keeps without undergoing change, is neutral, and has no odor. It is soluble in ether and chloroform, but does not mix with water or with glycerin. It is applied in a fairly thick layer, spread on linen or covered with cotton, as a dressing. The applications should be frequently made (twice a day), owing to the rapid absorption of naftalan. Mercury has been found to mix with this base more readily than with either fat or lanolin, and the ointment thus formed is readily absorbed and causes speedy relief from symptoms. It should be very lightly rubbed in, or furunculosis will result from closure of the ducts of the sebaceous glands. The remedy has been used by Rosenbaum,² in conjunction with other remedies, in a considerable number of conditions, such as burns, acute eczema, dry chronic eczema, acne rosacea, psoriasis, superficial wounds, phlegmonous affections of the subcutaneous cellular tissue, abscesses, chancre, bubo, and epididymitis, acute articular rheumatism, rheumatism of gonorrheal origin, cutaneous affections of traumatic origin, parotitis epidemica, inflammation of the throat-glands when of tuberculous character, lupus exulcerans, etc. We quote his conclusions: (1) The remedy was found to be harmless in all cases, and at no time was any injurious effect observed. (2) In burns, naftalan developed a wonderful analgesic, cooling, and antiinflammatory action, in this respect surpassing all other remedies. (3) The action of naftalan was especially excellent in acute and chronic eczema, pityriasis, dandruff, psoriasis, and lupus, yielding results unobtainable by means of any other remedy. (4) In erysipelas the course of the malady was at once favorably influenced, the inflammation being checked and the temperature

¹ Brit. Med. Jour., June 25, 1898; from Bull. de l'Acad. de Méd., Mar. 22, 1898.

² Am. Medico-Surg. Bull., June 25, 1898.

becoming normal on the second or third day. (5) On inflamed wounds and abscesses naftalan exerts an antiseptic and antiinflammatory action and accelerates cicatrization. (6) The pains of bruises, contusions, dislocations, and sprains are removed by naftalan, which acts as a resorbent and heals the wounds. (7) Rheumatism and gout are greatly relieved, the pain being lessened. (8) Naftalan also exerts an antiphlogistic, analgesic effect in epididymitis, bubo, inflammation of the lymphatic glands, etc. Naftalan has also been used with reported success by a number of other observers; and, while it is too early for any but the most conservative statements, present appearances are much in its favor.

Nuclein (see YEAR-BOOK for 1896, p. 1051).—A very suggestive study of 9 cases is published by Tomlinson,¹ who used Vaughan's nuclein solution, 5%, in those glandular enlargements of children which were once classified as "scrofula." The theory on which he gives the nuclein is that by the production of a leukocytosis some of the morbid elements which give rise to this condition might be removed and a condition of healthy nutrition thereby brought about. It is to be noted that no very rapid improvement occurred until a dose sufficient to cause some rise in temperature was given, nor was leukocytosis produced by a smaller dose. With sufficient dose, however, the patients seem to have increased in weight and to have improved in condition. While the number of cases is small, the use of nuclein would seem to be justified in such cases, and further clinical data would be of value.

Orexin still has its admirers, although their number is hardly commensurate with the years that the remedy has been before the profession. The most important communications on the subject of late are that of Scoguamiglio² and the report of Ferd. Steiner³ on his use of orexin tannate. Scoguamiglio speaks with the authority that is given by a fairly extended experience, his cases numbering more than 100. The chlorid was used in over 30 cases, but in a considerable number vomiting and a severe burning pain in the stomach followed its administration. From his experience, however, the pure alkaloid is not so irritating, for he reports no unpleasant symptoms whatever. He fully confirms the statement of Reeh (see YEAR-BOOK for 1898, p. 462) in regard to the value of orexin in the vomiting of pregnancy. It acted with remarkable rapidity in 5 cases, and in some he believes it saved life. The remaining cases upon which the report is based include anemia and chlorosis, atony of the stomach, nervous dyspepsia, gastric neuroses and chronic catarrhal gastritis, and pulmonary tuberculosis. In all marked improvement of the appetite and general condition is said to have occurred, and in some a cure is claimed. The dose was 4 to 7 gr. daily, in the form of "oblates." The pungent taste of basic orexin makes it often impossible to give the remedy to children, the very class of patients in whom it would often be most beneficial. This objection does not hold good with **orexin tannate**, a yellowish-white, odorless powder, having a taste much like chalk. It is not soluble in water, but dissolves readily in dilute acids and in the gastric juice. Steiner has made use of this preparation in about 100 cases, with almost uniformly good results and with no unpleasant symptoms. In a few cases the results were negative. To children from 3 to 12 years of age he gave 8 gr. twice a day, from an hour and a half to two hours before the principal meals, allowing nothing to be eaten between meals. The powder may be given in a little sugar and water, in capsule, or in chocolate-coated pill or tablet. It was found that when thus

¹ Jour. Am. Med. Assoc., Sept. 4, 1897.

² N. Y. Med. Jour., Oct. 9, 1897; from Centralbl. f. innere Med., Sept. 11, 1897.

³ Am. Medico-Surg. Bull., Apr. 10, 1898; from Wien. med. Blätt., No. 47, 1897.

given for 4 or 5 days the appetite returned, and it was possible to suspend the drug or to stop it altogether. If at the end of 2 days the appetite again failed, the remedy was again given for 5 days, and in most cases this was sufficient. In a few instances it was necessary to continue for 2 or 3 weeks or even longer. It was not found necessary to increase the dose, nor was any habit formed. The astringent tendency of the tannic acid seemed to be counteracted by the laxative effect of the basic orexin, so that it was rarely necessary to add laxatives to the treatment. The conditions that yielded most readily to treatment were anemia, inanition from lack of nourishment, neurasthenic states, gastric atony, and convalescence from acute infectious diseases. It was particularly valuable in the earliest stages of pulmonary tuberculosis, and in scrofula before the formation of tubercles. The author concludes that this preparation is the most reliable of the stomachics for children whenever it is desirable to increase the appetite or to excite and regulate peristalsis. [The vomiting and other evidences of gastric irritation produced by orexin hydrochlorate have resulted in the disuse of that salt. Orexin itself, however, appears to be innocent of ill effect, as does the tanbate.]

Orthoform is a new local anesthetic which may be described as practically a synthetic cocain. Einhorn and Heinz,¹ who introduce this substance, state that a local anesthetic that shall relieve the pain of exposed sensory nerve-endings must be both absolutely harmless and of slow absorption. These conditions they believe to be filled by orthoform, which they describe as a light, voluminous powder, crystalline and stable, white, odorless, and tasteless. It is dissolved slowly and sparingly in water, but in sufficient amount to produce anesthesia of healthy mucous membranes, as the conjunctiva, and of raw surfaces. The powder itself is used to produce complete anesthesia, and for wounds and ulcers an ointment is recommended. While apparently free from toxic effects, it is said to be markedly antiseptic. The hydrochlorate is a soluble crystalline salt; but is sufficiently acid to be irritating to sensitive mucous membranes and to preclude its hypodermic use. It has been given internally, in such conditions as ulcer and cancer of the stomach, in doses of $7\frac{1}{2}$ gr. several times a day, relieving the pain and producing no toxic symptoms. In fact, as much as 15 gr. have been given at a dose; but it is well to remember that toxic effects are rarely reported with new preparations until we forget that our early impunity was born of caution in dosage. Orthoform has been used successfully in the treatment of wounds; in burns, especially those of the third degree; in painful ulcerations, as in carcinoma, where its antiseptic action is of decided value; in fissures and excoriations of the mucocutaneous junctions, and in laryngeal ulcerations. In gonorrhea a 10% solution of the hydrochlorate was used, but was found rather too irritating for the acute stages, though the anesthesia was prolonged and the discharge was diminished. It is suggested, however, that in the form of emulsion or bougie the irritation would be less or absent altogether. In the conjunctival sac the aqueous solution of pure orthoform is sufficiently strong to produce anesthesia which, though more slowly developed, is more lasting than that from cocain.

Kallenberger² has used orthoform in surgery, and reports favorably upon it as: 1. A local anesthetic whenever sensory nerve-endings are exposed. 2. A nontoxic agent, thus permitting the use of large quantities on raw surfaces. 3. A powerful antiseptic. He finds that all pain disappears, as a rule, in from 3 to 5 minutes, and the freedom from pain lasts for 35 hours on an

¹ Münch. med. Woch., Aug. 24, 1897.

² Med. Age, June 10, 1898; from Berlin. klin. Woch., Mar. 21, 1898.

average. If exudation be abundant he advises the use of an ointment instead of the powder.

Neumeyer¹ reports on a fairly extensive use of orthoform, including laryngeal ulcer, gastric ulcer, urethral pains, painful wounds, etc. He found that when brought into direct contact with exposed nerve-ends it produced complete anesthesia, which lasted for hours and sometimes for days. It is of no value in cases in which there is no solution of continuity in skin or mucous membrane. No untoward effects were noted even after doses of 3 to 4 gm. daily.

Pellotin.—It will be remembered that Pilez (see YEAR-BOOK for 1898, p. 948) placed the range of dose for this drug at $\frac{1}{8}$ to $\frac{2}{3}$ gr. when given hypodermically. The communication of Langstein² is therefore of interest in this connection. After a dose of $\frac{1}{8}$ gm. he has seen cyanosis; weak, thready pulse; cold extremities; clammy skin, and collapse that required active stimulation. He therefore believes it wiser to begin with very small doses and to increase gradually.

Periplocin.—*Periploca Græca* is a plant belonging to the order Asclepiadeæ, indigenous to Greece and the southwest coast of the Black Sea. It is naturalized in Western New York, where it is known by various names, among them "milkvine," "silkvine," and "climbing dog'sbane." Burginsky³ found, experimenting in 1896, that the bark of this plant contained a glucoside, which he designated *periplocin*, and which he considered an isomeric or polymeric form of Schmiedeberg's digitalin. From his experiments on frogs he concluded that this glucoside was a cardiac poison, affecting the heart's action like the digitalis-group, and in large doses stimulating also the respiratory and vomiting-centers. He stated that atropin was its antagonist. In detail, he found that the heart's action was first slowed by a stimulation of the pneumogastric center. At the same time the blood-pressure was increased by stimulation of the vasomotor centers in the spinal cord and medulla. If continued or with larger doses, the blood-pressure continued to rise, but the heart's action became more rapid. Still larger doses caused a fluctuation in the blood-pressure, the heart's action at the same time becoming irregular, and at last stopping suddenly. Levasehoff⁴ was led to investigate this substance by its ready solubility in water and the comparative blandness of this solution when used hypodermically, causing much less local inflammation than either digitalin, digitoxin, or Merck's digitoxin (see p. 912). He first determined the dose by trials on animals, on healthy human beings, and finally, with caution, on patients. The maximum dose per day for hypodermic injection was fixed at 1 mgm.; sterilized solutions were used and very slight local inflammation resulted. The results were studied first with the sphygmograph. The slowing of the pulse-rate and the increase in blood-pressure were found to persist for an hour or more. When the pulse was dicrotic, it became fuller and more regular and the dicrotism became less marked. The area of cardiac dulness was unchanged, except after prolonged administration; but the impulse became more marked, and the normal heart-sounds and any murmurs that were present became more distinct. In cases of diseases of the heart the secretion of urine was often markedly increased; but in dropsy of renal or hepatic disease and in healthy subjects there was no change. A substance which caused reduction of Fehling's solution, but which reacted to none of

¹ Am. Medico-Surg. Bull., Jan. 25, 1898; from Münch. med. Woch., Band xlv., S. 1230.

² Am. Medico-Surg. Bull., Mar. 25, 1898; from Centralbl. f. Nervenh., Aug. 1, 1897.

³ Vratsh, No. 28, 1896.

⁴ Ibid., No. 11, 1898.

the other tests for sugar, was generally found in the urine after a second injection of the glucoside.

Peronin is brought forward as a substitute for morphin, if a salt of morphin may be properly so called. In chemic composition it is a hydrochlorate of the benzyl ether of morphin, and is said to occur as a dirty-white, bulky powder, composed of very fine prismatic crystals, odorless, but having a bitter taste, and with a tendency to cause a burning sensation in the throat, so that it is best given in cachet or syrup, though the powder or a tablet may be used. The salt is readily soluble in hot, and with some difficulty in cold, water; but insoluble in concentrated alcohol, chloroform, or ether. The dose is variously stated at $\frac{1}{6}$ to a little more than $\frac{1}{2}$ gr., 3 or 4 times a day. Although one of the more recent German products, a considerable number of favorable reports are already on record, almost entirely from German sources. Schröder¹ has been so widely quoted that we refer only to his conclusion that peronin is better borne than morphin by most patients, and is preferable to codein to produce sleep. It is used chiefly to control cough, if one may judge by the reports. Nowak and Munk² each speak favorably of the remedy in this connection, and the latter also speaks highly of it as a hypnotic, saying that in his hands it has produced sleep in cases in which morphin and codein had previously failed. Eberson,³ after using peronin in 16 cases, including acute and chronic bronchitis, pulmonary tuberculosis, and whooping-cough, states that the drug had no injurious effect on appetite, digestion, circulation, or general condition of patients, and gave rise to no toxic symptoms, except some drowsiness in the case of a child of 2 years. Acute bronchitis is said to have been readily cured; and in hysterical coughs and whooping-cough the results were excellent. In the more chronic conditions the irritation was diminished and the amount of the expectoration became less, with no diminution in the power of expulsion. It also acted well in producing sleep. [The chief objections to the use of morphin are: First, the danger that the patient will become a habitual user of the drug; and second, the tendency to produce constipation. The reports so far do not seem to prove that peronin overcomes these objections any more satisfactorily than other and better-known salts of morphin; in fact, it is too early to make any statement in regard to habitual use. The fact that the new preparation is a salt of morphin might lead one to fear that it would be open to the same objections, and no one claims that it is more active than the preparations now in use. We are therefore inclined to regard peronin from a very conservative standpoint. Our opinion, too, of codein in the very cases in which peronin is reported as so advantageous has always been of the highest (see YEAR-BOOK for 1898, p. 932); and though peronin may indeed exert a greater hypnotic power, we have seldom had reason for disappointment with codein in that respect. At the same time we have considered its relative freedom from causing disturbance of digestion and the little danger of its abuse among its strongest recommendations. Possibly peronin can show better results than can codein in the so-called irritable cough, but we doubt it.]

Phesin is a sulpho-derivative of phenacetin similar to the acetanilid-derivative cosaprin (see p. 910), and said by Vámosy and Fenyvessy,⁴ the only observers who have thus far commented on it, to possess similar advantages. Phesin is a reddish-brown powder, light and amorphous, odorless, and of a rather acid and salty taste. It readily forms a slightly acid solution in water, this solution being brown in color. It is said that the dose should be from

¹ Ephemeris, Jan., 1898; from Therap. Monats., Heft 4, 1897. ² Ephemeris, Jan., 1898.

³ Am. Jour. Med. Sci., Mar., 1898; from Therap. Monats., No. 11, 1897.

⁴ Therap. Monats., Aug., 1897.

one-half to three-quarters greater than that of phenacetin, and that the effects are of shorter duration.

Piperidin guaiacolate, as it is termed, is formed by the action of piperidin on guaiacol in a suitable solvent, such as benzine or petroleum-ether. It crystallizes in prismatic needles or plates, melts at 79.8° C., and mineral acids or alkalis decompose it into its constituent parts. It forms a solution in water which is saturated at 3.5%, and is easily soluble in most of the organic solvents. Its action is the subject of an investigation by Arnold Chaplin and F. W. Tunnicliffe.¹ The pharmacology of the compound becomes the pharmacology of its constituents, for it is resolved into piperidin and guaiacol in the body, probably by the alkaline secretion of the duodenum, as no eructations of guaiacol occur even after large doses have been given. To test its value in pulmonary tuberculosis 14 cases in various stages of the disease were selected. The commencing dose was 5 gr. 3 times a day, and this was gradually increased to 20 gr., without unpleasant effects. The patients all seemed to improve; but the authors very justly call attention to the fact that in some, at least, of the cases this may be accounted for by the improved food and hygiene. They consider, however, that the following conclusions are justifiable: (1) Piperidin guaiacolate is a perfectly safe drug in doses from 5 to 30 gr. 3 times a day. (2) It produces no unpleasant effects. (3) It is exceedingly well borne by the stomach, and in this respect it is equal to any other derivative of creosote. (4) Patients while under its influence usually improved in appetite and general strength.

Plasmins.—These are liquids which Buchner and Hahn² have obtained from the cell-secretions of lower organisms, and which they consider to be the cause of the specific action of the cells of those organisms. It is believed that by the injection of the plasmins of pathogenic bacteria it will be possible to produce in the individual thus treated an artificial immunity to the disease of which the bacteria are the specific cause. Thus it is found that after the injection of a proper amount of cholera-plasmin (a few c.c.) in proportion to body-weight, guinea-pigs are able to bear 10 times the fatal dose of a culture of cholera-bacilli without harm, and this immunity is said to have lasted at least 8 days. The plasmin of the typhoid bacillus, it is claimed, also gives immunity against typhoid fever. The plasmins are obtained by an interesting process, of which the cholera-plasmin will serve as an example. A large number of cultures on agar are allowed to grow for one or two days until a thick, vigorous growth results. This is then collected and carefully triturated with quartz-sand or infusorial earth, and is made into a sort of dough by wetting with water, with a 20% glycerin solution, or with physiologic salt solution. This "dough" is transferred to a cloth and subjected to hydraulic pressure, beginning with 4 atmospheres and gradually increasing up to 500. The fluid thus obtained, after being clarified by filtration through a thick filter, is at first bright yellow, but in a few hours becomes darker or even brownish, presumably from the absorption of oxygen. This fluid is the plasmin. The plasmin of *Bacillus tuberculosis* was freed from bacteria by filtering through infusorial earth. It was found, however, that if 20% of glycerin and 5% of sodium chlorid were added to the doughy mass, not only could the mass be kept for some time, if cold, without undergoing change, but the fluid obtained from it needed no filtration. Tuberculo-plasmin, so-called, has the property of decomposing hydrogen peroxid. If the plasmin be heated to 60° C. this property is lost, and if hydrocyanic acid be added it is suspended, but is

¹ Am. Medico-Surg. Bull., Sept. 10, 1897; from Brit. Med. Jour., Jan. 16, 1897.

² Am. Medico-Surg. Bull., Mar. 10, 1898; from Apoth. Zeitung.

regained when the acid is removed by passing warm air through the liquid. These facts, together with some others, are said to point to the presence of a hydrolytic ferment in the plasmin. As yet, no reports of the clinical use of these interesting substances have appeared. Such reports will, however, be of great interest, and will throw light upon the practical value of this means of producing immunity from disease.

Protargol is said to be a combination of silver with a proteid base. It occurs as a yellowish powder, which forms a clear solution in cold water in strengths up to 50%. This solution is of brownish color, neutral in reaction, and unchanged by heat. It is not precipitated by alkalies, sulphids, albumin, or sodium chlorid; nor is it broken up by acids, although precipitated by concentrated hydrochloric acid. It is said to contain about 8% of silver in stable combination with the proteid molecule. Benaria¹ has investigated the power of this agent to arrest the growth of and to destroy bacteria. He found that a 1% solution killed anthrax- and typhoid bacilli, *Bacterium coli*, and the pneumococcus after comparatively short exposure; the bactericidal power being greater when the germs were in albuminous media. Anthrax-spores were destroyed after an hour's exposure; but the *Staphylococcus pyogenes aureus* and *albus* proved to be less readily affected than other bacteria. The toxic properties of the drug were also investigated by preparations being given by the mouth, subcutaneously, and instilled into the eyes of rats and rabbits. Local irritation was well marked in the last two methods when the more concentrated solutions were used (*i. e.*, 1% subcutaneously and 20% in the eye). Benaria then used the drug in the treatment of gonorrhea in the male, in solutions of 0.3% to 1.5% strength. He commenced with the weaker solutions and gradually increased the strength as tolerance became established. He states that the discharge diminished rapidly, and that the gonococci disappeared from the urethra in 2 weeks. The only unpleasant effect was a slight smarting. Besides its usefulness in gonorrhea, he has found protargol a good antiseptic in infected wounds and the smaller abscesses, such as paronychia, in which the powder or solution gave good results. In ulcers of the leg a 5% to 10% ointment was useful. Neisser² has used protargol in gonorrhea, and reports very favorably upon it. He advises that treatment be begun, as soon as a bacteriologic diagnosis can be made, by the injection of a 0.25% solution, which should be increased gradually up to 1%. The condition of the posterior urethra should be ascertained and the injection carried back, if it is found to be involved. This is done by causing the solution to be retained in the urethra for 30 minutes, when it will be found that the sphincter has relaxed and allowed the fluid to penetrate to the deep urethra.

Pedersen,³ of New York, although admitting that his experience with the preparation is comparatively limited as yet, considers protargol superior to argonin, and therefore the best of the so-called organic silver compounds, for the following reasons: 1. It is more potent, requiring solutions of only $\frac{1}{4}$ % to 1% strength. 2. It forms a cleaner and more stable solution. 3. It is much less likely to irritate. 4. Its bactericidal action is more rapid. He cites cases which show a very rapid disappearance of gonococci from the pus and diminution of the discharge. In his experience, however, a relapse occurs if the protargol is discontinued at this time, owing, he thinks, to the coming to the surface of the gonococci from the deeper layers of the mucous membrane. He advises, therefore, that the injections be kept up for some days after the

¹ Jour. Am. Med. Assoc., Feb. 12, 1898; from Deutsch. med. Woch., Heft 49, 1897.

² Brit. Med. Jour., Dec. 11, 1897; from Centralbl. f. Derm., Oct., 1897.

³ Paper read before the N. Y. Med.-Surg. Soc., Apr. 4, 1898.

discharge has stopped, and then be gradually diminished in frequency, at the same time keeping a careful watch for any return of the gonococcus. When the protargol is entirely discontinued an ordinary hand-injection of one of the mineral or vegetable astringents is recommended to be used for a time. [This agent has also been used in the eye and in gynecologic practice, chiefly to destroy the gonococcus, with reported good results. Comments are so far very generally favorable; but the commercial enterprise which uses all such reports for advertising purposes is to be regretted, we think. The preparation, however, seems to deserve a more extended trial.]

Pyraloxin is an oxidation-product of pyrogallol, prepared by exposing the latter to the action of air or of ammoniacal vapors. It is a dark-brown or black powder, which is slightly soluble in water, but insoluble in alcohol or ether. It was introduced by Mielek,¹ and further recommended by Unna to replace pyrogallol in the treatment of diseases of the skin, particularly psoriasis and eczema. Unna finds that the disadvantages of pyrogallol, such as local irritation, staining of the skin, absorption with toxic symptoms, etc., are avoided when pyraloxin is used, while the curative effects are the same. This was proved by comparative tests with ointments of pyrogallol and of pyraloxin.

Pyramidon, the antipyretic and analgesic proposed as a substitute for antipyrin (see YEAR-BOOK for 1898, p. 951), has been the subject of some comment. It is described as a yellowish-white, crystalline powder, practically tasteless, and soluble in 10 parts of water. It is derived from antipyrin by a process of substitution, and is chemically di-methyl-amido-antipyrin. Its value as compared with the older drug seems to be a matter of considerable dispute, some observers holding that pyramidon is by far the more active preparation, while others say that it is only slightly more active. It seems generally agreed, however, that a considerably smaller dose is effective. Pyramidon is less soluble than antipyrin and is slower in producing an effect; but the effects are more lasting, and no unpleasant results are reported as yet. The dose generally recommended is 5 to 8 gr., although 3 gr. are often sufficient. Filehne,² after a considerable use, speaks highly of this preparation, both as an analgesic and antipyretic, giving 5 to 8 gr. 3 times a day. He describes it as a prompt agent for the relief of pain and mild in reducing temperature. Lépine³ found that in dogs 0.2 gm. per kgm. of body-weight produced death in a few hours; but in 20 patients to whom he gave the remedy he observed no bad results, while pain was relieved quite readily in most instances. Houeffer⁴ used pyramidon in a considerable number of cases, among them 45 phthisical patients. He saw no bad results from its use, which he says may be kept up for months with safety and with no lessening of the effect. He found it a good analgesic, and febrile temperature was lowered from 0.5° to 2.5° C. after a single dose, rising again slowly in from 4 to 6 hours. Feuerstein⁵ is somewhat more conservative. After using pyramidon in 59 cases, of which 42 were phthisical patients in all stages of consolidation, he concludes that it is a fairly certain antipyretic. In neuralgia he obtained no results which he considered worthy of note; and in rheumatism he found it practically of no value, though given in full dose several times a day. As an antipyretic the

¹ Am. Medico-Surg. Bull., Jan. 25, 1898; from Pharm. Zeitung, Band xlii., S. 565.

² Ephemeris, Jan., 1898; from Berlin. klin. Woch., Band xxxiii., S. 1061.

³ Brit. Med. Jour., July 10, 1897; from Lyon méd., June 13, 1897.

⁴ Jour. Am. Med. Assoc., Dec. 25, 1897; from Berlin. klin. Woch., Heft 35, 1897.

⁵ Brit. Med. Jour., Nov. 20, 1897; from Centralbl. f. d. ges. Therap., Oct., 1897.

least reduction of temperature obtained was 1° C. and the greatest 3° C., both following a dose of 8 gr. In all cases the reduction was gradual, reaching its lowest point in about 2 hours, and beginning to rise again in from 4 to 6 hours. He found it possible even to prevent any rise of temperature by using small doses at short intervals. Like other observers, Feuerstein had no unpleasant results. [Caution is clearly to be observed in the use of pyramidon until further acquaintance with it gives more complete knowledge of its poisonous effects in man. Although no bad clinical results are as yet reported, its toxicity in animals and its close kinship to antipyrin support Huchard's exhortation to caution.]

Saccharin.—Descheemaeker¹ has conducted experiments with this substance with a view to its usefulness as an intestinal antiseptic. He used that preparation known as "Monnet's No. 3," a sodium saccharinate containing about 90% of pure saccharin. When given to the human subject in doses of 15 to 30 gr. each day, about 2 hours before the principal meal, he believes that this preparation ranks among the best of the intestinal antiseptics. In all the experiments, both those in which rabbits were used and those on man, the results obtained were constant. The germs ordinarily found in the intestine, especially the *Bacillus coli*, were considerably decreased in number. In diseased conditions the saccharin is well borne, and the urine, though analyzed daily, showed no change, even the elimination of urea remaining constant. [While these experiments are interesting, and saccharin may prove an efficient intestinal antiseptic, we would call attention to the fact pointed out by Flügge, that its administration is harmful to diabetics in whom the digestive functions are deranged, since it retards the action of all digestive ferments. As these patients are not apt to take more than 6 or 8 gr. a day at most, it is surely reasonable to suppose that the larger doses proposed by Descheemaeker would have an even more decided action upon the chemistry of digestion.]

Salitannol is a new antiseptic said to combine the properties of salicylic and tannic acids. It is said to be formed by the condensation of molecular quantities of salicylic and gallic acids, and the formula given is $C_{14}H_{10}O_4$. It is a white, amorphous powder, insoluble in water, ether, chloroform, or benzine, or in cold solutions of the alkaline carbonates. It is slightly soluble in alcohol and dissolves readily in caustic alkaline solutions, being precipitated from these by acids. It melts, with decomposition, at 210° C. Clinical reports are not yet to be found.

Salophen is allied to salol in its chemical composition, for it contains salicylic acid (51%) and acetyl-paramido-phenol (49%); but is said to be much less liable to give rise to toxic symptoms. This probably arises from the slow decomposition of salophen, which is unchanged by acid media. It is therefore only when it comes in contact with the alkaline secretions of the pancreas and small intestine that it is broken up into its constituent parts. The salicylic acid is said to unite with glycol and to be eliminated in the urine as salicylic acid or sodium salicylate; the phenol forms a sulphate; and a part of the salophen is got rid of without decomposition. Elimination is said to begin within three-quarters of an hour and extends over a considerable time. The drug is without odor or taste, and is very generally well borne. Sixty gr. a day, given in divided doses, seem to be an effective amount in most cases; but much more than this can be given without untoward effect. When large doses are given, however, a considerable quantity of the salophen is eliminated unchanged, and is therefore believed

¹ N. Y. Med. Jour., May 14, 1898; from *Echo méd. du Nord*, Apr. 10, 1898.

by most observers to be practically inactive. Cappelair,¹ finding salophen efficient as an antirheumatic, was led to try it on 4 cases of sciatica, all acute. All yielded readily without showing any ill effects from the treatment. Baqué² found salophen an efficient remedy in acute rheumatism. While not so powerful as sodium salicylate, it had the advantage of not producing the unpleasant symptoms, such as headache, dizziness, ringing in the ears, etc., that so often follow the administration of that drug. As it passes unchanged through the stomach, it would be unlikely to produce irritation of that organ. In chronic rheumatism it seemed no more effective than other remedies; but in neuralgic pains it seems to exert an analgesic action similar to that of antipyrin and phenacetin. In skin-affections, especially those accompanied by itching, it was found to be very effective, a result that is corroborated by de Wannemaeker,³ who gives salophen internally in doses of 4 to 5 gm. a day. The effects are not always good; but he has used it in prurigo, urticaria, seborrhoeic eczema, and psoriasis of long standing.

Sanatogen, one of the newer nutrient tonics, is said to be a sodium and casein glycerin phosphate, containing on an average 13.02% of nitrogen. It is readily soluble, and its smell and taste are said to be more agreeable than those of other preparations from the casein of milk. It is one of the class of undigested albuminous nutrient preparations, and a teaspoonful or more may be added to warm soup and taken with the meals. Vis and Treupel⁴ have investigated the digestibility of sanatogen along with other albuminous preparations. Healthy men were selected for the observations, which extended over a week in each case, and on each day the amount of work done was practically the same. About half the total nitrogen ingested was derived from the substance to be investigated. In the case of sanatogen it was found that the increase in the nitrogen excreted was very slightly over the amount excreted when other albumins were used. Believing that "the less digestible a substance is the greater will be the excretion of nitrogen," they consider sanatogen worthy of more extended trial.

Sanose, an albuminous food-preparation recently put on the market, is a white, odorless, tasteless powder, which forms a milk-white mixture with water, and is said to consist of 80% of casein and 20% of albumose. In many respects it resembles sanatogen and somatose; but at any rate seems less liable to cause diarrhea than the latter. It has been studied by Schreiber and Waldvogel,⁵ who found that trypsin digested it, as did pepsin and hydrochloric acid, the latter acting at 40° C. Sanose is therefore indicated when for any reason it is desired to replace carbohydrates by an albuminous food. It may be given in cocoa or soup, and a palatable bread containing a considerable amount of albumin can be made by adding 10% of sanose. It may also be given in milk or added to nutritive enemata. A number of cases were tabulated to show the changes in body-weight; in the excretion of nitrogen, urea, uric acid, and phosphoric acid; and in the daily amount of urine. It was found that when sanose was given the excretion of nitrogen at first increased very rapidly, and that when a nitrogenous equilibrium was established it was at a higher figure than before.

Somatose, one of the more recent of the prepared foods, is gaining considerable popularity, although reports upon it are not numerous. A. Lataud,⁶

¹ Med. Ann., 1898; from Gaz. degli Ospedali e delle Clin., No. 35, 1896.

² Brit. Med. Jour., Dec. 4, 1897; from Jour. de méd., Sept. 10, 1897.

³ Ephemeris, Jan., 1898; from Wien. med. Blätt., Band xx., S. 145.

⁴ Brit. Med. Jour., Mar. 19, 1898; from Münch. med. Woch., Mar. 1, 1898.

⁵ Brit. Med. Jour., Dec. 4, 1897; from Deutsch. med. Woch., Oct. 7, 1897.

⁶ Jour. de Méd. de Paris, Apr. 18, 1897.

of Paris, reports favorably upon its use in persistent vomiting, whether due to pregnancy or to some other cause, such as anesthesia. He considers that it has a distinct antiemetic action, and cites a number of cases in proof of his assertion. Not more than 4 teaspoonfuls of this food can be taken in a day without causing diarrhea. To overcome this objection Schmidt¹ prepares a somatose from milk-casein, with which he combines chemically 5% of tannic acid. This preparation, which is readily soluble in water, is said so far to destroy the irritating effects of somatose upon the digestive system that healthy individuals can take as much as 50 gm., more than twice the dose of the plain somatose, without any ill effects whatever. He advises that it be given in doses of 5 to 10 gm., dissolved in hot water and added to some meat-extract or broth. He has used it with success in chronic catarrhal conditions of the large and small intestines; but it is not of much service as an astringent. R. Drews² believes that somatose has a specific action as a galactagogue upon the lactating mammary gland in all cases of deficient secretion not due to disease or deformity. In most of these cases headache, pains in the back and breast, loss of appetite, etc., were complained of, and these symptoms disappeared with the establishment of free secretion under the administration of somatose. The same author speaks favorably of the use of the combination of iron and somatose, the **eisensomatose** of the Germans, which Roos³ describes as a brown powder, containing about 2% of iron in organic composition, and soluble in water. The dose is about 75 gr. a day. When given in large doses the same tendency to produce diarrhea noted with somatose appears. Without any desire to detract from the merits of somatose, but simply to show that there is another side to the question worthy of consideration, we quote from Klemperer, of Berlin, who says: "Somatose contains 9 gm. [of dry albumins] to the same measure [teaspoonful], equalling 33 calories. Contrasted with this, one egg or 100 c.c. of milk furnish 70 calories, and how much cheaper the latter are!" And, we might add, how much less apt to irritate the intestinal canal.

Spleen-extract.—The action of this substance has been investigated by Clark,⁴ who considers that it increases the blood-supply to the skin and stimulates the activity of the cutaneous glands, at the same time improving digestion and the general nutrition of the body. This is the case particularly in acute conditions, as his series of cases seem to show. Upon the pulse the effect is still involved in considerable doubt, though careful sphygmographic tracings of the radial pulse were recorded. So far the records seem to point to a lowering of the blood-pressure; but this was by no means well marked. The rate of the pulse seems to have been increased by from 15 to 45 beats to the minute; and in most cases the temperature rose 0.5° to 1° F. The improvement in digestion seemed to be more constant than the increase in the desire for food. In fact, in some instances the extract apparently gave rise to nausea. In some instances also the secretion of saliva was increased. The bowels were probably but little affected, and no changes were definitely noted in the urine, though further research is advised in this particular. An increase in weight was the rule, though it did not always occur, and the gain varied considerably with different individuals. Upon the blood, also, the effects were inconstant, although it seemed that the improvement was more marked in the more anemic patients, women being more generally affected

¹ Brit. Med. Jour., Jan. 29, 1898; from Münch. med. Woch., Nov. 23, 1897.

² Brit. Med. Jour., Feb. 19, 1898; from Centralbl. f. innere Med., Jan. 22, 1898.

³ Therap. Monats., Sept., 1897.

⁴ Am. Jour. Med. Sci., May, 1898; from Edinb. Med. Jour., No. 512, 1898.

than men. Upon the skin the effect appears to have been most beneficial. There seemed to be determination of blood to the superficial capillaries and increased activity of the cutaneous glands. An improved color, with greater softness, and moisture amounting to a mild perspiration, was the rule. The effects upon the brain were most interesting, and the extract would seem to act in many cases as a direct stimulant to the mental processes. The data are, however, insufficient for positive conclusions. Outbursts of temper were not an infrequent occurrence, especially in men; and there seemed to be a considerable increase in the mental activity of several adolescent males who were in a stuporous condition. It was found that the ethereal extract, in the form of an emulsion containing 5 gr. to the fluidram, was the most active preparation, and this was given in a maximum daily dose of 4 drams.

Strophanthus continues to find favor in all sorts of conditions as a cardiac stimulant in spite of the known unreliability of its preparations. Wilcox¹ continues his clinical studies of the drug (see YEAR-BOOK for 1898, p. 953), and seems to have added some valuable facts to our knowledge of its use and abuse. He first used fluid extracts made from various species of strophanthus: *S. hispidus*, *S. Kombé* (pubescent), and *S. Kombé* (nonpubescent). The last of these was found to contain nearly twice as much strophanthin as the others. As in the previous observations, tracings of the pulse-curve were made with the sphygmograph at frequent intervals and carefully compared. These regularly show a marked improvement both in the force and regularity of the systole during the administration of the drug. The symptoms from which the patients sought relief, also, in nearly all cases diminished or altogether disappeared. It soon became evident, however, that these preparations were giving rise to digestive disturbances of varying severity—loss of appetite, nausea and vomiting, abdominal pain, and diarrhea. In this respect, therefore, the author concludes that the fluid extract is a less valuable preparation than the tincture, as no such unfavorable symptoms had followed the use of the latter in his hands. The next observations made by Wilcox were with hypodermic tablets of strophanthin from the same sources as the fluid extracts, the dose being $\frac{1}{250}$ to $\frac{1}{200}$ gr. in each case. One of these tablets was given dissolved in a teaspoonful of water before each meal. The effect upon the action of the heart seemed to be quite as favorable, to judge by the tracings; and the digestive disturbances noticed where the fluid extracts were used were not seen after the use of strophanthin. The conclusions reached by the author are, therefore, briefly as follows: The tincture of *Strophanthus Kombé* (pubescent variety) is a good and active preparation in the maximum dose of 5 drops 4 times daily. The fluid extracts are unsuitable preparations because of the digestive disturbances to which they give rise. These disturbances seem to be independent of the amount of strophanthin contained in the crude drug, and are probably due to the character of the preparation. The hypodermic tablets of strophanthin seem to be free from this objection in dose of $\frac{1}{350}$ to $\frac{1}{200}$ gr., and are a satisfactory preparation. From a limited experience the author thinks that strophanthin may be given successfully in dose of $\frac{1}{350}$ gr. without causing local irritation. The advantages over digitalis possessed by the approved preparations of strophanthus are: The greater rapidity of action, the absence of the so-called cumulative effects, and the fact that the caliber of the arteries is not interfered with. E. M. Houghton,² after a prolonged study of the pharmacology of strophanthus, reaches practically the same conclusions. He believes it to be one of the most easily standardized of the heart-tonics, owing to the ready solubility of strophanthin.

¹ Jour. Am. Med. Assoc., Sept. 11, 1897.

² Ibid.

Nevertheless he has found the crude drug and the preparations on the market to vary in strength within wide limits, many being practically inert. He thus summarizes the pharmacology of the drug: "Its chief action is upon the nervous mechanism controlling the action of the heart, and upon the heart-muscle itself, lessening pulse-rate, increasing the blood-pressure, and augmenting the work of the heart without causing constriction of the arterioles or any special action on the vasomotor mechanism, the diuresis and other important results being due mainly to improved circulation." The advantages over digitalis, according to Houghton, are the absence of gastric disturbances and of cumulative action; the fact that it does not cause contraction of the arteries; the greater speed and certainty of its action, and the ease with which it may be used hypodermically, owing to the readiness with which strophanthin dissolves. The additional fact that its preparations can be readily standardized is in itself no small advantage, but one of which we have, unfortunately, yet to see the fruits. [It is a satisfaction to see that more attention is being given to strophanthus than has been the case. It is a drug that we have always rated high and used freely. While we do not consider it so potent as digitalis, it has the undoubted advantages over the latter which have just been stated, and these in many cases requiring tonic or stimulant action upon the circulation are sufficient to call for its use. It need not be said that standardized preparations are greatly needed, as well with strophanthus as with many other drugs; but for the present it is our custom to use the official tincture of strophanthus, and, as a rule, we have found satisfaction therewith.]

Stypticin (Merck's) is chemically the hydrochlorate of cotarnin, the latter being an alkaloid obtained by the oxidation of that therapeutically useless alkaloid of opium, narcotin. Cotarnin is an amorphous, bright-yellow powder, of very bitter taste, forming a light-yellow solution in water, which darkens on exposure to light. In chemical composition it is closely allied to hydrastinin, and is scarcely inferior to it in therapeutic value, with the additional advantage of cheapness. The alkaloid is by no means a new one; but recent investigations would seem to show that it is of more value than has been supposed. Several observers, among whom Gottschalk was perhaps the most prominent, had found the hydrochlorate of cotarnin of value as a hemostatic and sedative in gynecologic practice. This led Marfori¹ to study the physiologic action of the preparation by means of experiments on animals. He defines cotarnin as methyl-oxyhydrastinin. The action of its hydrochlorate is, first, to stimulate the central nervous system, and it may thus even cause convulsions; secondarily it causes a general paralysis, and death is due to respiratory paralysis. At the same time there is a slight narcotic action. Small doses have no effect on temperature or on sensation, nor do they affect the blood-pressure; but with large doses it falls markedly. There is no tendency to hasten coagulation of the blood, and although the kidney regularly diminishes in size, this is found to be due rather to lessened cardiac activity than to contraction of the arterioles. In view of these facts it is difficult to explain how this drug acts as a hemostatic, as the clinical reports seem to show that it does. Ronosse and Walton,² working along the same line, conducted experiments upon the frog, rabbit, and dog. They also state that sensation is but little affected, and that death is due to a paralysis of the respiratory center. Upon the circulatory apparatus the drug acts as a stimulant, although producing slight vasodilatation. It first increased the fulness

¹ Brit. Med. Jour., Feb. 12, 1898; from Arch. Ital. de Biol., vol. xxviii., No. 2, 1897.

² Brit. Med. Jour., June 25, 1898; from Belg. méd., May 19, 1898.

of the pulse, then reduced it to normal or even less, and again increased it until the amplitude of the pulse-wave 2 or 3 hours after intravenous injection reached a maximum of $1\frac{1}{2}$ to $2\frac{1}{2}$ times the normal. Later, this again diminished, reaching the normal 4 to 5 hours after administration. As compared with hydrastinin, the action of cotarnin upon the heart was less rapid, and on the abdominal blood-vessels it had no action at all. The authors compare the action of the former alkaloid to that of ether, and that of the latter to digitalis. They therefore recommend the one in acute and the other in chronic conditions. They have used stypticin clinically in a considerable number of cases of uterine disease with good results, the usual dose being from $1\frac{1}{2}$ to $2\frac{1}{2}$ gr. in pill. In hemorrhage due to tumors of the uterus the only effect was an improvement in the pulse. In postpartum hemorrhage and in abortion accompanied by hemorrhage the effect was not so satisfactory as when hydrastinin was used, owing to the slower action of stypticin; but in menorrhagia due to endometritis, whether given before or during the menstrual period, the effect was both good and lasting. Upon the gravid uterus it acted to increase both the force and frequency of the contractions quite independent of its effect on the supply of blood. [Opinions are divided as to the action of stypticin upon the gravid uterus, some authorities claiming that no contraction is induced by it.]

Suprarenal Capsule.—Abel and Crawford¹ have made a preliminary report of their research into the chemical composition of the blood-pressure-raising constituent found in the medullary portion of the suprarenal capsule (see YEAR-BOOK for 1898, p. 926). While they have not isolated the active principle in sufficient quantity or in pure enough form to admit of the building up of a formula, many important facts have been brought out, which we can best state by quoting the summary given by the authors: "The blood-pressure-raising constituent of the suprarenal capsule may be completely precipitated from an aqueous extract by treatment with benzoyl chlorid and sodium hydrate, according to the Schotten-Baumann method. On decomposing the resulting benzoyl-products a residue is obtained which possesses great physiologic activity. It gives the color-reactions of Vulpian, reduces silver nitrate, and possesses the other specific qualities of suprarenal extracts. With the help of alkalis a carmin-red pigment may also be separated from these decomposition-products. We take this pigment to be that of one of the chromogenic substances of Vulpian which gives the rose-carmin color when suprarenal extracts are treated with oxidizing agents or alkalies. A volatile, basic substance of a conine-like odor is always found to accompany the crude benzoate. When these substances are removed the active principle is left as a highly active sulphate or hydrochlorate, as the case may be. It is therefore a basic substance. Its salts give a color-reaction with ferric chlorid; they also reduce silver nitrate, but not Fehling's solution. It is not possible to split off pyrocatechin from this isolated active principle. The fact that dry distillation causes the appearance of amines and pyrrol in abundance, taken in connection with its ability to take up acid radicles, its reducing power, its precipitability by cupric acetate and iodine chlorid, and its physiologic action, lead us to conclude that our active principle is to be classed with the pyridin-bases or -alkaloids."

Tannalbin.—Two preparations of tannic acid, tannalbin and tannigen (see p. 937), have risen rapidly in favor. Tannalbin is described as a pale-yellow, tasteless powder, containing about 50% of tannic acid, and prepared by subjecting tannin albuminate to dry heat for a considerable time. It seems

¹ Bull. Johns Hopkins Hosp., July, 1897.

to be generally agreed that the preparation passes unchanged through the stomach and is slowly decomposed in the intestine, setting free tannic acid. Porter,¹ however, states that he has obtained good results in gastritis, both acute and chronic. He gives tannalbin freely, and finds that it often arrests the excessive secretion of mucus. He believes that it acts by precipitating the mucus, thus removing the most favorable medium for the development of bacteria. The tannic acid is so slowly liberated that the irritation so frequently caused by it does not appear, although it acts as an efficient astringent. He finds it very useful in both the acute and the chronic diarrheas of children, but calls attention to the importance of proper diet and hygiene as well. Verelyette² reports his experience with tannalbin in a large number of cases of diarrhea from various causes. He gave doses of 2 to 4 gm. daily, and says that in most cases cure was complete in from 2 to 6 days, though some cases were more resistant, and in diarrhea of nervous origin no effect was produced. In some cases it was found necessary to continue the use of the drug in smaller doses after the symptoms had subsided, in order to prevent a relapse. His conclusions are as follows: "(1) Tannalbin, a combination of tannin and albumin, participates in the properties of tannins. (2) It possesses the advantage, physiologically, of traversing the stomach without being attacked, and exerting its effects in the intestines only when it is decomposed into feebly peptonized albumin and tannin. (3) In theory every diarrhea is clinically amenable to tannalbin; practically, however, the majority of cases of tuberculous origin of the last stage are refractory, as are those also of nervous origin. (4) Tannalbin is easily administered; 2 gm. a day as a minimum, and 4 gm. daily as a maximum dose, are given in cachet for from 1 to 8 days. (5) The prolonged employment of tannalbin has never provoked accidents nor disagreements." Conrad Stein³ has also used this remedy, and reports his success in 62 cases in both hospital and private practice, of which 51 had diarrhea arising from a variety of causes, both acute and chronic. The usual single dose was 15 gr., and the daily amount given varied from 45 gr. to 2 drams. The author noticed that when a daily dose of 1 to 1½ drams was not effective, no increase in dose, even when persisted in for weeks, produced the desired result. Moreover, when no change followed the administration of this dose at the end of a week, it was useless to continue the drug. With these exceptions, however, he considered the results positive and sure to reward patient and persistent use. He speaks most favorably of its action in acute and chronic enteritis, in epidemic dysentery, and in the diarrhea of phthisis. He found it also an excellent styptic in intestinal hemorrhage. Tannalbin was also used by this authority in 10 cases of nephritis in which the urine contained a considerable amount of albumin. The administration of the drug was followed by a reduction to about 1% to 2% in the amount of albumin excreted; but persistent use failed to cause complete disappearance. One should not forget, in this connection, that proper regulation of diet and mode of life often accomplishes the desired result. Holzapfel⁴ gives his experience with tannalbin in a considerable number of cases of diarrhea, mostly in children. Cases as nearly similar as possible were treated both dietetically and with calomel as control-cases. In all, the results obtained with tannalbin are said to have been distinctly better than with the treatment employed in the control-cases. The doses given to nurslings were from 4 to 7 gr.; to older children

¹ Am. Jour. Med. Sci., Jan., 1898; from Post-Graduate, Nov., 1897.

² Am. Medico-Surg. Bull., 1897.

³ Ibid., Sept. 10, 1897; from Wien. med. Presse, Band xxxviii., S. 686.

⁴ Ibid., Dec. 10, 1897; from Deutsch. med. Woch., Band xxii., x. 812.

about twice this quantity. Three or four doses were given each day, at intervals of an hour, for 2 or 3 days. About 8 doses thus given usually sufficed; but where it seemed necessary larger doses were given and treatment continued for a longer time without untoward effects.

Tannigen, the odorless and tasteless acetyl tannin, is, like the rest of this group of tannin-compounds, insoluble in water and acids, but soluble in alkaline media. It possesses the same advantages in the treatment of diarrhea that are claimed for tannalbin and tannon, but seems to have been active in somewhat smaller doses.

Tannoform (see YEAR-BOOK for 1898, p. 955) has been the subject of very little comment during the past year. M. Eberson,¹ of Tarnow, has used it, and reports successes in the treatment of eczema and favus, both with a powder consisting of one-third tannoform and two-thirds talcum, and with a 10% ointment. In hyperidrosis pedis he reports brilliant results. The healing of sluggish infected wounds, as well as of recent wounds and of ulcers, was accelerated. He considers tannoform a valuable therapeutic agent.

Tannon, another of the condensation-products of tannin, and one of the newest, is described by E. Schreiber.² It is said to be prepared by the condensation of tannin and hexamethylene tetramin, and to be a brown, light, tasteless powder, slightly hygroscopic, almost insoluble in water, weak acids, alcohol, and ether, but soluble with difficulty in weak alkaline fluids. It contains 87% of tannin, considerably more than either tannalbin or tannigen are said to contain. Like these compounds, it is said to be inactive until it reaches the intestine, where it is decomposed by the alkaline fluids. The dose exhibited was 15 gr. 3 or 4 times a day to adults, and from 3 to 5 gr. at similar intervals to children. No disagreeable results are reported, but, while it seemed as active as the other tannin preparations in checking diarrhea, its advantage over them and, therefore, its reasons for existence are not evident. [This preparation, or one whose description exactly corresponds, has been put on the market in this country under the name of "tannopin."]

Tanosal is a synthetic combination of creosote and tannic acid, described as an amorphous, dark-brown powder, having an odor of creosote, and so hygroscopic that it is dispensed in pills or, better, in a solution containing about 18 gr. of tanosal to the ounce. A tablespoonful of this solution may be given 3 times a day, and the dose may be gradually increased even to twice that amount. The taste is said to be unpleasant. According to G. Kestner,³ this drug possesses the advantages of ready solubility in water, of exerting no caustic action upon healthy mucous membranes, and of not interfering with digestion. This author used it in 75 cases of disease of the lungs and bronchi, with generally favorable results. In simple bronchial catarrh he obtained the best results. Appetite was improved, dyspnea diminished, and expectoration became less. In pulmonary tuberculosis the good results that commonly follow the administration of creosote were obtained, together with a diminution in the number of râles and an increase in body-weight.

Tenalin is the name given to a teniafuge recently prepared from the areca or betel-nut. [This nut has long been used in the East as a masticatory, and has some reputed virtues as a tonic, particularly in dropsies, as an anti-periodic, and as an anthelmintic, especially for round and tape-worms.] In preparing tenalin it was intended to eliminate, if possible, the principle known

¹ Am. Medico-Surg. Bull., May 10, 1898; from Aertzt. Centralbl. Anzeig., No. 26, 1897.

² Am. Medico-Surg. Bull., Apr. 11, 1898; from Therap. Beil. d. Deutsch. med. Woch., Band xxiii., S. 81.

³ Am. Jour. Med. Sci., July, 1897; from Therap. Monats., Band xi., S. 609, 1896.

as arecolin, while retaining the alkaloids arecain, arecadin, and guvacin, which are believed to exert the anthelmintic effects. Hobday¹ has observed its action in over 60 cases in animals. He finds that it is not necessary to follow this agent by a purge, and that its small bulk makes it easy of administration. A minim for each pound of body-weight, given pure or with a little more than an equal amount of water, gave the best results; though the dose could be doubled without danger. With larger doses vomiting, increased peristalsis with colicky pain, and the passage of fluid stools occurred. The only after-effects, however, were dulness and slight diarrhea. In one case an unusually large dose given subcutaneously caused collapse and death, and led to the belief that tenalin is not suitable for hypodermic use. On the tape-worm tenalin exerts the most marked effect, nearly always causing the expulsion of the head as well as the segments. At the same time peristalsis is increased, causing the passage of fluid feces. Against ascarides also the remedy is very effective, causing the worms to be vomited or expelled in the feces. [We do not gather from our reading what the composition of tenalin may be. Areca-nut itself, freshly grated, has had much employment in India as a vermifuge, the usual dose being a teaspoonful. Considerably larger doses were recommended by Edward Morris, who regarded this as an efficient remedy against tape-worm, using as much as 4 to 6 drams. The dose generally given, however, has been 1 to 2 drams. It has been supposed that the alkaloid arecain represented the active properties of betel-nut and resembled pelletierin in action. That it would prove of value as a teniacide has been the expectation of many, its power to promote peristalsis having been adduced in its favor. Its great toxicity, however, is certainly against its general use.²]

Theobromin.—Baronaki³ highly recommends this agent in the astyole of old people dependent upon disease of the kidneys. He gives large doses, 30 to 45 or even 75 gr., but continues the use of the drug for only a short space of time, as he has seen nausea, vomiting, vertigo, and cerebral excitement, with occasionally an increased amount of albumin in the urine, following its too prolonged use. He finds that the diuresis is marked and occurs very promptly (12 to 24 hours), especially where digitalis has been previously given; but considers that the results are no better when theobromin is combined with sodium salicylate or caffeine. With the increase in the secretion of urine the cardiac and respiratory symptoms improve and the signs of uremia rapidly disappear. [About 2 years ago we made use of the sodiosalicylate of theobromin (diuretin) in a considerable number of cases. Our experience coincided with that of H. A. Hare, who has found this preparation practically inert in the great majority of cases; and we finally abandoned the use of the drug altogether. Recently, however, the statements of other physicians have led us to believe that theobromin itself, especially when given in rather large doses, might be more active in spite of its insolubility. If this is true, it will doubtless soon be more generally used; although it should be borne in mind that, since it is said to act by stimulating the secretory epithelium of the kidney, its effectiveness would be diminished where the destruction of tissue was considerable, and for the same reason its use would be contraindicated in acute inflammatory conditions, where sedatives would be preferable.]

Thyroid extract is so generally used and to meet so many indications that we are beginning to learn when it should not be used. We believe it is pretty generally recognized now that in tuberculosis and in certain cases of disease of

¹ Brit. Med. Jour., Feb. 12, 1898; from Jour. Comp. Path. and Therap., Dec., 1897.

² See U. S. Disp., 17th ed., p. 1558.

³ Therap. Gaz., Dec. 15, 1897; from Med. Chron., Sept., 1897.

the heart this agent often does harm. H. C. Wood¹ suggests another contra-indication. In 4 cases which came under his observation the administration of thyroid extract was followed by a violent outbreak of gouty or rheumatic symptoms, no such symptoms being present when the drug was first taken. Indeed, in one case the patient had never before had any such symptoms to her knowledge. While so few cases can establish no principle, they are suggestive, especially when considered in the light of Cunningham's belief, that the effects of the administration of thyroid gland are due to some organic principles, probably toxic, resulting from postmortem changes in the gland.

Tribromphenol bismuth (xeroform) is one more of the "perfect" substitutes for iodoform, and has therefore a considerable legacy of skepticism to overcome. Perhaps it is for this reason that reports are not as yet very numerous. It is described as a fine yellow or slightly greenish, practically odorless and tasteless powder, with neither irritating nor toxic properties, which is unaffected by exposure to light and air, and may be sterilized by heat. It may be used in powder or as 10%, 20%, or 30% gauze, and has been taken internally without harmful results in doses up to 90 gr. Most of the reports come from Vienna, where it has been used by Grünfeld, Beyer, and Fink as an antiseptic dressing for wounds, in eczema due to iodoform, and in eczema of mycotic origin. These favorable reports are supported by E. Heuss,² who states that it possesses the properties of both its constituents, tribromphenol and bismuth oxid, in that it promotes drying and prevents fermentation and the growth of bacteria. At the same time it is anodyne and promotes the growth of epithelium. He has used it in suppurating cutaneous affections, in ulcers, in recent wounds and burns, purulent buboes, gonorrhea, and diseased conditions of mucous membranes, with good results. The surface should be well cleaned and the powder dusted on and covered with a bandage. It is said to be less powerful as an antiseptic when mixed with fats, and does not therefore act well in ointments. In gonorrhea it is used in emulsion as an injection in from 1% to 20% strength.

Tuberculin-R.—The rather flagging interest in tuberculin as a therapeutic agent has received a new impulse during the past year, owing to the introduction of a new preparation from the laboratory of Robert Koch, which he designates tuberculin-R. In a very interesting monograph³ Koch describes the steps which led to the discovery of this new preparation. The end in view was to obtain an immunity to tuberculosis. Immunity may be of two kinds—*i. e.*, the bacterial cause of a disease may be destroyed within the organism, or the toxin produced by the specific germ may be rendered powerless though the germ still thrives. In the former case a cure ensues; but in the latter temporary improvement is the best that can be hoped for. In tuberculosis a bacterial immunity—that is, an immunity arising from the fact that the tubercle-bacillus cannot thrive in the organism—was rendered difficult, and in many cases impossible, by the necrosis and encapsulation which are a part of the pathologic change. To obtain such an immunity it was essential that the antagonistic material should be disseminated throughout the organism; but if either living or dead bacilli were injected abscesses were the invariable result, and absorption was therefore rendered impossible. It thus became necessary to obtain the immunizing agent in such form that it could be readily absorbed without causing local inflammation, and in sufficient quantities to prevent the growth of the

¹ Phila. Med. Jour., May 28, 1898.

² Am. Medico-Surg. Bull., July 25, 1897; from Therap. Monats., Band xi., Heft 4.

³ Dublin Jour. Med. Sci., May 2 and June 1, 1898; from Deutsch. med. Woch., Heft 14, 1897.

tubercle-bacillus in the body. With these objects in view, Koch first prepared a glycerin extract (tuberculin) of the dried tubercle-bacilli. The action of this agent is too well known to require comment here; but it may not be as well known that its failure to realize all that was hoped from it is believed to be due to the fact that it gives an immunity from the toxin only, without affecting the growth of the bacilli to any marked degree. While its value for diagnosis, therefore, is very generally acknowledged, its therapeutic value is considerably restricted. Carrying the investigation further, the bacilli were extracted with a 10% normal caustic soda solution and the product filtered and neutralized (tuberculin-A). This gave a reaction similar to that of tuberculin when used in small doses; but with the larger doses sterile abscesses resulted, owing to the presence of a few dead tubercle-bacilli. The latest result of the investigation, and the one that is now attracting attention, is made by grinding the dried bacilli in an agate mortar, suspending the result in water, and separating, by means of a very rapid centrifuge, into an opalescent liquid (tuberculin-O) and a solid residue. Tuberculin-O resembles tuberculin in many respects. The residue is again dried, pulverized, suspended in water, and separated, the liquid thus obtained being tuberculin-R. It is said to contain the elements that are insoluble in glycerin. Although a reaction similar to that following the use of tuberculin may be obtained with large doses, it is undesirable and is said to be unnecessary in producing immunity. This immunity is said to be bacterial and, therefore, curative in properly selected cases. The reaction is avoided by beginning with a very small dose and gradually increasing. 20% of glycerin is added in order to preserve the fluid, as this amount does not interfere with the solution, and proper dilution is obtained with physiologic salt solution. No antiseptic is used. Koch further states certain conditions that are essential to the production of a sufficiently powerful tuberculin-R. Only highly virulent cultures should be used, and these must not be too old. The drying must only be undertaken in a vacuum exsiccator, and absolutely no chemical substances must be introduced. It is also important that both the cultures and the completed preparation be protected from the light, and that the cultures be worked up as soon as they have become dry. [It will be readily seen from the above description that the preparation of tuberculin-R is a work of no little difficulty and danger. It is equally evident that the whole matter is as yet in the experimental stage, and that the indiscriminate use of whatever preparation may be offered can only result in disaster and delay a final conclusion. When one considers how readily a carelessly prepared specimen might be converted into a pure culture of the most virulent bacilli, it is easy to understand that, for the present at least, the use of such an agent should be left in the hands of men who thoroughly understand its preparation and who are fitted to select the cases in which it may be properly employed. It may be that the way lies open to great results; but much remains to be done before we shall have a remedy that is generally available. It has been used in a considerable number of cases, the most favorable reports being where the lesion was sharply localized, as in tuberculous ulcers and in lupus; but as yet the data are insufficient for any positive conclusion as to the value of the remedy.]

Urea.—The diuretic powers of urea have been further studied (see YEAR-BOOK for 1898, p. 958) by C. Beckert,¹ who agrees with Klemperer in recommending this substance as one of the most active of diuretics in cirrhosis of the liver. He considers it also a very valuable remedy in the ascites due to tuberculosis.

¹ Am. Medico-Surg. Bull., Oct. 25, 1897; from Wien. med. Presse, Band xxxviii., S. 910.

ANATOMY.

BY C. A. HAMANN, M. D.,

OF CLEVELAND, OHIO.

Anatomic Nomenclature.—The new nomenclature proposed by the German Association of Anatomists is finding its way into the more recent continental text-books of anatomy. Spalteholz, in his *Atlas*, and Richter, Stöhr, and Romiti in their text-books, follow the new nomenclature, as do also Toldt and Rauber. In the works of the last two authors synonyms are omitted, thus lessening materially the burden upon the student's memory, as well as saving a considerable amount of space. In England and America not much attention has been paid to the subject.

An Odontoid Process of the Atlas.—E. Funke¹ describes a process on the upper surface of the anterior arch of the atlas which he found in 2 out of 126 specimens. This process was 7 mm. in length, rounded at its upper extremity, and bent dorsally over the tip of the odontoid process of the axis. On its dorsal surface it articulated with the odontoid process of the axis; there was no articulation with the occipital bone. The author regards this process as the cranial epiphysis of the atlas, which, instead of becoming a part of the body of the bone, has united with the anterior arch of the atlas.

Congenital Absence or Delayed Development of the Patella.—H. N. Moyer² records a case of absence of both patellæ, associated with marked stigmata of degeneracy, in an imbecile. Little³ has collected the recorded cases of absence of the patellæ with the signs of degeneracy usually associated with this defect.

Homologies of the Pectoral and Pelvic Limbs.—Stieda⁴ presents an entirely different conception of the homologies of the extremities from the one held formerly by all anatomists. He declares that the extensor muscles of the upper extremity are homologous with the extensors of the lower extremity, and that in comparing the muscles of the limbs no attention is to be paid to the function of these muscles. He denies the occurrence of "rotation" of the limbs, and states that the bending (*knickung*) of the limb occurs in a different direction in the two limbs—forward in the upper extremity and backward in the lower. The muscles on the anterior aspect of the upper extremity are homologous with those on the anterior aspect of the lower extremity. In comparing the forearm with the leg the former is to be placed in the prone position, inasmuch as the leg is permanently prone.

Sexual Differences in the Skull.—P. Bartels⁵ has examined nearly 1100 skulls with the object of determining, if possible, whether or not there are differences between the skulls of males and of females which will enable the observer to "make a diagnosis" in any given case. None was found.

¹ *Anatom. Anz.*, Band xiv., S. 385.

² *Lancet*, Nov. 27, 1897.

³ *Ibid.*, p. 781, Sept. 25, 1897.

⁴ *Internat. Med. Congress*, Moscow, 1897; *Anatom. Anz.*, Band xiv., Heft 8, S. 227.

⁵ *Inaug. Diss.*, Berlin, 1897.

While in many cases the skilled observer can judge quite accurately of the sex, there are other instances in which it is quite impossible, and mistakes are often made. The well-known facts as regards the greater size, weight, degree of prominence of processes for the attachment of muscles, etc., were confirmed by the author's investigations; the foramen magnum is larger in the male. All these probably depend upon the greater size of the body in the male. In the male the masticatory apparatus is more highly developed, as shown by the greater weight of the mandible and firmer temporomaxillary articulation, and by the fact that the angle formed by the body and ramus is more nearly a right angle; the fossa tympanico-stylo-mastoidea and the processus retroglenoideus are more often found in the male. The greater size of the marginal process of the zygoma (Panichi, 1892) and the greater length of the mastoid process (Ellis, 1894) cannot be depended upon in the differentiation.

Symmetry of the Liver.—James Cantlie¹ brings forth some arguments for the adoption of a new view of the arrangement of the right and left lobes of the liver. According to Cantlie, the liver is to be regarded as consisting of a right and a left "side" or lobe, the subdividing-line extending from the fundus of the gall-bladder to the point at which the inferior vena cava grooves the back of the liver; in other words, that there are two lobes or livers, which are united along a median line, the left half including the lobus spigelii, quadratus and caudatus. The gall-bladder lies in a position midway between the lobes. As is well known, the liver originates as two hypoblastic diverticula from the ventral wall of the duodenum, the two diverticula subsequently existing at the hepatic ducts. Upon dividing the liver in the line indicated, the two parts were very nearly equal in weight. The right and left branches of the portal vein, artery, and hepatic duct are practically of the same size. Furthermore, it was not possible to inject the right from the left portal vessels, and *vice versa*. Upon injecting the two divisions of this vein the line where the areas supplied by each met corresponded to the weight-line. Some pathologic evidence also seems to show the original symmetry of the organ. Langenbuch² had previously alluded to the symmetry of the liver. He mentions instances of double gall-bladders as favoring the view that the right and left lobes were originally symmetrical. He adduced as factors in determining the asymmetry of the liver, the great length of the intestinal canal and its mode of development by which the stomach comes to occupy mainly the left half of the abdomen, and thus crowds the liver to the right and leads to inequality in the size of the lobes. This crowding of the liver to the right continues after birth, owing to the rapid increase in size of the stomach when it becomes physiologically active. The disparity in the relative size of the two lobes of the liver is not nearly so marked in the child at birth as it is in the adult.

Development and Morphology of the Vascular System in Mammals.—The Posterior End of the Aorta and Iliac Arteries.—A. H. Young and A. Robinson,³ basing their view on observations on the development of the posterior part of the large systemic vessels in the mouse, rat, cat, sheep, and ferret, have arrived at conclusions somewhat at variance with those previously held. Only one or two will here be mentioned: "The vessels to be looked upon as the posterior continuations of the primitive aorta in the adult in man, rodents, etc., are the common iliac, internal iliac, and hypogastric arteries; and in carnivora, etc., the internal iliac and hypogastric

¹ Jour. Anat. and Physiol., vol. iii., part i., 1897.

² Chir. d. Leber u. Gallenblase, Deutsch. Chir., Lief. 45 c. S. 3.

³ Jour. Anat. and Physiol., vol. iii., part iii., p. 605, 1898.

arteries. The common and internal iliac arteries are not segmental vessels; their branches may be. The middle sacral artery is a secondary branch, probably representing fused segmental vessels." [This artery has usually been regarded as a continuation of the aorta.]

Venous Circulation of the Lower Extremity and its Significance in the Surgery of the Femoral Vein.—Paul Müller¹ finds that the femoral vein is not the only vessel returning blood from the lower extremity; the most important collaterals are the obturator and gluteal veins and the subcutaneous veins at the posterior and upper part of the limb. After occlusion of the femoral vein the resulting stasis disappears as soon as the collateral channels become sufficiently enlarged. In this process many of the valves become incompetent, though it is not absolutely necessary for the valves at the entrance of the tributaries of the common femoral vein to become incompetent in order to re-establish the return-flow from the limb. The prognosis in cases of ligation of the common femoral vein is good as far as gangrene of the limb is concerned. If in addition the artery is tied, the danger is increased; ligation of the profunda femoris vein in addition to the common femoral adds to the gravity of the case.

Structure of the Cerebral Veins.—H. Triepel² corrects the commonly accepted belief that there is no muscular tissue in the wall of the cerebral veins. He has found involuntary muscle in them all. In the larger and medium-sized veins it is present in considerable amount, though it does not form a continuous layer; the involuntary muscle-cells lie isolated, surrounded by collagenous fibers. He also describes the elastic tissue of these veins, and states that it is characterized by great simplicity in its arrangement and by the extraordinary delicacy of many fibers. In the walls of the larger veins 3 layers of elastic tissue can be distinguished; these are not sharply differentiated from one another and vary in their relative thickness. The author objects to the term "elastic tissue," using in its stead "yellow connective tissue."

Anatomy and Physiology of the Mammary Glands.—Ernst Unger,³ from a complete study of the structure and function of the mammary glands as well as their mode of development, comes to the conclusion that they are modified sudoriferous glands, and not sebaceous. The evidences supplied by their normal and pathologic anatomy, by their phylogeny and ontogeny, all point to this conclusion. Minot also, in his *Embryology*, states that the mammae are to be regarded as being derived from coiled or sudoriferous glands.

Inclusion of Lobules of the Parotid Gland in Lymph-nodes.

—R. Neisse⁴ describes the lymph-nodes embedded in the parotid glands in 14 new-born children. From 8 to 14 of these nodes were found in every case. No regularity was observed in the position and form of these nodes. Their size varied from 0.15 to 4.5 mm. The larger nodules are well-formed lymph-glands, with cortical and medullary portions, trabeculae, lymph-channels, and lymphoid tissue; the smaller ones do not always have a capsule, and are made up merely of a collection of lymphoid cells between which capillaries pass, but no lymph-channels. In most of them the capillaries are well developed, the lumina being large and the walls thick. In some of these nodules, as was first observed by Langhans, there is found parotid gland-tissue, either as scattered acini, sometimes in groups, or as smaller or larger lobules with ducts. Usually they are separated from the lymphoid tissue by fibrous tissue. If the lymph-

¹ Arch. f. Anat. u. Physiol. (Anat. Abth.) Suppl. Band, S. 339, 1897.

² Anatom. Anz., Band xi., Heft iii., S. 289.

³ Anatom. Anz., Band x., Heft ii., S. 153, 1898.

⁴ Ibid., S. 289.

nodule has a hilus the gland-tissue enters through this; in some instances the capsule is simply invaginated by the acini. The lymph-nodules were found in a fetus 8 cm. in length; in a fetus 9 cm. long acini were found in one of the lymph-nodules.

Crescents of Gianuzzi.—Rudolf Krause¹ states that these cells are secretory in character, their secretion being an albuminate. Their crescentic shape is of no special significance and is due to pressure; if the serous cells are few in number and are situated at the extremity of a mucous tubule, they become compressed into the form of a crescent. A like result occurs if mucous cells, which are placed near the ends of serous tubules, are subjected to pressure.

Glands of the Nasal Mucous Membrane.—M. Goerke² describes the secretory apparatus of the nasal mucosa as consisting of superficial goblet-cells lying in depressions in the ciliated epithelium and deeper glands (Bowman's tubular glands). In addition to these he describes acinose serous glands with single excretory ducts. These had previously not been described. They are found only in the mucosa of the lateral wall of the nose, between the inferior and middle turbinated bones.

Tyson's Glands.—That the smegma preputii is not a sebaceous secretion has now come to be pretty well recognized. J. Tandler and P. Domeny³ have examined the penis in 50 subjects, and find that the "glands" of Tyson are really cutaneous crypts, not true glands, and are particularly abundant in the vicinity of the frenum. Occasionally sebaceous glands are met with on the glans penis and in the coronal sulcus; but they are to be regarded as aberrant formations (*versprengte Gebilde*). The smegma is consequently to be looked upon as consisting of macerated epithelium, and not as a glandular secretion.

Suprarenal Bodies.—A. Kohn,⁴ basing his views upon researches extending over all classes of vertebrates, regards the suprarenal body as an epithelial structure, resembling the epithelial bodies in the vicinity of the thyroid gland. In fishes they are purely epithelial; in amphibians, reptiles, and birds the adrenals contain a considerable number of sympathetic nerve-elements which have a great affinity for chromium salts.

Brain-weight in Childhood.—Pfister⁵ has investigated the weight of the brain of children in 156 individuals. Some of his results are as follows: Very hyperemic brains weigh about $7\frac{1}{2}\%$ more than normal ones, and very anemic brains $7\frac{1}{2}\%$ less than normal ones. Thus are explained some of the varying statements of authors in regard to this question. His measurements confirm the general belief that the brain-weight of males exceeds that of females. Individual peculiarities, nutritive and pathologic irritants, and perhaps functional activity, play a part in determining the rate and time of growth of the brain. In rachitic children the cranial bones and the brain itself are often quite vascular, though the absolute brain-weight is often greater. The left cerebral hemisphere was in general heavier than the right. The cerebellum was found to be heavier in boys than in girls.

Cerebral Convolutions.—Waldeyer⁶ suggests that the origin of the convolutions is to be sought in the unequal development of different neurons, which causes certain parts of the exterior of the brain to grow more rapidly than others. Inasmuch as the brain is enclosed by a firm covering, its surface must become folded. In those animals whose brain is not convoluted, it must

¹ Arch. f. mikr. Anat., Band xlix., Heft 4, S. 707, 1897.

² Ibid., S. 547.

³ Wien. klin. Woch., Band xi., 23, 1898.

⁴ Prag. med. Woch., Band xxiii., 17, 1898.

⁵ Arch. f. Kinderh., 1897.

⁶ Internat. Med. Congress, Moscow, 1897; Anatom. Anz., Band xiv., S. 230.

be imagined that the development of the skull proceeds at an equal rate with that of the brain. Waldeyer could find no sexual differences in the convolutions, either in adults or in the new-born; nor could he acknowledge the existence of a peculiar type of brain in criminals.

Structure of the Spinal Ganglion-cells.—M. von Lenhossék¹ gives a careful description of the human spinal ganglion-cells, his preparations having been obtained from the ganglia of a healthy male adult who had been executed. The cells have, in general, the form of a sphere which is elongated in one direction. The diameter varies from 25 to 100 μ , their size varying according to the importance of the region of the body from which the entering nerves come. Each cell has a connective-tissue investment, upon the inner surface of which is a single layer of epithelium. They are almost uniformly unipolar, and the cell-process, which subsequently divides into a central and a peripheral part, is thickest at its point of attachment to the cell-body. The body of the cell contains chromophilous masses which appear as small granules or as irregular clumps, for which the author suggests the name *tigroid*, owing to the appearance they give to the cell. These masses present no regularity of arrangement; in the immediate vicinity of the nucleus, in the peripheral portions of the cell, and at the place of origin of the nerve-process these granules are absent. The cells vary in the amount of this granular material which they possess. There were also found in the spinal ganglia small, dark cells; also cells with large granular masses; and finally, a fourth type, the cells of which are quite light in color. The spinal ganglion-cells, except the small ones, are markedly pigmented; the pigment increases in amount with advancing years. The author denies that the ground-substance of the cells is fibrillated. The cell-nucleus is from 16 to 20 μ in diameter, sharply differentiated from the cell-contents, and possesses a nuclear membrane. There is a single nucleolus, which is about one-third the diameter of the nucleus and is situated in the middle of the cell. The framework of the nucleus consists of a pale delicate substance known as *linin*, in which are many granules and collections of granular material. There is an accumulation of linin about the nucleolus and also near the nuclear membrane.

Distribution of Nerves of Sensation and of Taste in the Tongue.—Richard Zander² finds that the lingual branch of the third division of the fifth nerve supplies the mucosa of the body of the tongue only, no filaments extending posterior to the sulcus terminalis, which separates the root from the body of the tongue. The papillae circumvallate, which are in front of the sulcus terminalis, therefore are in the area supplied by the lingual nerve. He also found that branches of this nerve extend across the median line of the tongue; and at the tip of the tongue nerve-filaments could be traced 5 mm. beyond the median line, and in the vicinity of the foramen cæcum from 5 to 7 mm. It was found that the glossopharyngeal nerve supplies the mucosa of the root of the tongue, and that its filaments extend laterally 1 to 1½ mm. beyond the sulcus terminalis, and nearer the median line from 6 to 8 mm. anterior to the circumvallate papillae. Thus it appears that while the lingual nerve is limited to that portion of the tongue developed from the tuberculum impar, the glossopharyngeal is distributed to the part formed from the second and third branchial arches; and its terminal branches end in the posterior part of the body of the tongue; this last-named area, comprising the papillae foliate and circumvallate, therefore receives branches from both nerves. The superior laryngeal nerve supplies part of the root of the tongue, an area about 1½ cm. long and about 1 cm. wide, extending anteriorly to the middle of the root of the

¹ Arch. f. Psych. u. Nerv., Band xxix., S. 345.

² Anatom. Anz., Band xiv., S. 131.

tongue; the area supplied by this nerve lies $\frac{1}{2}$ to 1 cm. from the median line. The glossopharyngeal also supplies this region. Numerous anastomoses between the terminal branches of the right and left lingual nerves were found; these have not been described by previous writers.

Cutaneous Branches of the Intercostal Nerves.—V. E. Merten¹ has made careful dissections of several of the lateral cutaneous branches of the intercostal nerves, and has shown that there is an overlapping of the territory supplied by the different nerves. He found that the fourth intercostal nerve supplied the integument over 3 intercostal spaces and 3 ribs, beginning at the third interspace and ending over the sixth rib. The fifth intercostal supplied the skin from the fourth rib to the seventh. Thus the integument over and between the fourth and sixth ribs is supplied by both the fourth and fifth intercostal nerves. (These facts are of interest in connection with the subject of herpes zoster.) The experiments of Sherrington and the dissections of Zander have conclusively shown that the territories supplied by different sensory nerves overlap.

Posterior Interosseous Nerve.—J. P. McMurrich² has examined a number of subjects with a view to determining whether the gangliform enlargement at the termination of the posterior interosseous nerve, which is described in English text-books, exists. He found the enlargement in every case examined, though it was variable in size. The enlargement is "mainly due to an aggregation of connective tissue around the nerve, where it breaks up into the filaments which pass to the carpal articulations." Upon examining the sections of the swelling there were found, between the nerve-fibers, bodies which greatly resembled Krause's sense-organs; he regards these as identical with the sense-organs described by Horsley as endings of *nervi nervorum*. Turner has described a case in which the posterior interosseous nerve was continued into the integument of the fingers, instead of terminating at the wrist; this is normal in certain of the anthropoids. The morphologic interest in the ganglion may probably lie in the fact that there has been a shortening of the nerve associated with a concentration of connective tissue around it.

Vagus Nerve.—U. Barratt³ has examined transverse sections of the vagus nerve made at the end of the origin of the superior laryngeal and at several points above this, at the origin of the recurrent laryngeal and below this, as well as at points between the two laryngeals. It was found that the vagus nerve is made up of "bundles of nerve-fibers which present the peculiarity of being repeatedly rearranged as the nerve travels onward, so that the appearance of transverse sections is constantly altering, even at closely contiguous levels—that is, at levels which above the inferior ganglion are only a few mm. apart, and in the neck are separated by a few cm. This rearrangement may be compared to that which occurs in the plexuses formed by the spinal nerves; for instance, the brachial plexus. There is considerable variation in different nerves in this respect. It is to be noted that at the level of origin of the superior laryngeal nerve the inferior can also be recognized, and this is of interest in connection with the fact that both are distributed to the same region, though to different parts. In the pharyngeal and laryngeal branches the large medullated fibers are conspicuous; whereas in the main trunk there are numerous small medullated and nonmedullated fibers. The pulmonary and the thoracic cardiac branches not infrequently consist of non-medullated fibers, sometimes with and sometimes without small medullated fibers. The nonmedullated fibers in the main trunk, which are not uncommon,

¹ *Anatom. Anz.*, Band xiv., S. 174.

² *Brit. Med. Jour.*, Oct. 2, 1897.

³ *Jour. Anat. and Physiol.*, vol. xii., part iii., p. 422, 1898.

are usually found on the periphery. The inferior ganglion of the vagus bears a close resemblance to a spinal ganglion in its structure.

Nerves of Lymph-vessels.—A. S. Dogiel¹ has found networks of nonmedullated nerve-fibers on the walls of the large lymphatics of the penis and prepuce, as well as on the nonmuscular walls of the small lymphatics of the gall-bladder. These nerve-fibers can frequently be seen to come from the nerves accompanying the blood-vessels. As these fibers send filaments to the muscle-cells of the lymph-vessel wall, Dogiel is inclined to believe that they are motor in function. Timofeef, who is the only investigator who had previously described nerves of lymph-vessels, regarded them as secretory in function.

Elastic Fibers of the Sclera.—H. Sattler² finds that the elastic fibers of the sclera are always found on the surface of the connective-tissue fibers, in close connection with them and running in a parallel direction. In the lamina cribrosa there are many elastic fibers, none of which, however, lie in the long axis of the fibers of the optic nerve. In the optic disk there are no elastic fibers except those in the adventitia of the retinal vessels. In the dural sheath elastic fibers run in all directions. The elastic tissue in the adventitia of the central retinal vessels is present in relatively the same amount as in other vessels of like caliber.

Some Observations upon the Anatomy of the Kidney.—G. E. Brewer³ has recorded the results of his examination of the position of the kidney in 151 dissecting-room subjects. He also gives figures showing the result of the examination of 200 clinical cases. Of the 151 subjects, 91 were males, 56 females, and in 4 the sex was not recorded. The upper limit of the right kidney was found opposite the eleventh rib in 78 cases, opposite the twelfth rib in 62 cases; $\frac{1}{2}$ in. below the twelfth rib in 1 case, and 1 in. below the twelfth rib in 8 cases. In 2 cases the position was uncertain or the organ had been removed. The upper border of the left kidney was opposite the last rib in 1 case, opposite the eleventh rib in 100 cases, opposite the twelfth rib in 43 cases; $\frac{1}{2}$ in. below the twelfth rib in 2 cases, $\frac{3}{4}$ in. below the twelfth rib in 1 case, and 1 in. below the twelfth rib in 2 cases. Congenital absence of the left kidney was noted in 1 case. One hundred and twelve right kidneys were supplied by a single renal artery, and 33 by two arteries; 103 left kidneys were supplied by a single vessel, 37 by 2, 7 by 3, 2 by 4, and 1 by 5. A large artery entered the upper pole of the right kidney in 8 cases; the lower in 3. The left kidney received a large artery at the upper pole in 11 cases; at the lower in 3 cases. [The frequency of supernumerary renal arteries and the fact that these vessels not uncommonly enter at one or other pole of the kidney should be borne in mind by the operator in the performance of nephrectomy.] In one subject 4 ureters were found, 2 from each kidney; the 2 from the right kidney united near the bladder, whereas the two on the left side entered the bladder separately.

Shape and Position of the Bladder in the Child.—A. Birmingham⁴ finds that the moderately distended bladder in a child under 4 years of age has the form of an egg, flattened above and below; the larger pole is directed upward and forward. The base is but little developed, and projects but little or not at all beyond the posterior surface of the prostate. At birth about half of the bladder is intraabdominal, and the older the child becomes the further this organ sinks into the pelvis. The point of reflection of the peritoneum from the bladder to the anterior abdominal wall is to be found mid-

¹ Arch. f. mikr. Anat., Band xlix., Heft 4, S. 791, 1897.

² Arch. f. Anat. u. Physiol. (Anat. Abth.), Suppl., Band, 8, 335, 1897.

³ Med. News, July 31, 1897. ⁴ Jour. Anat. and Physiol., vol. xii., part iii., p. 458.

way between the symphysis and the umbilicus in the new-born, and gradually sinks as the infant becomes older.

Skiagraphy after Injection of Vessels with Mercury.—H. J. Stiles¹ has had skiagraphs taken of the arteries of limbs, of the vessels of certain viscera, and of the trachea and ureter, etc. Before injecting the mercury it is necessary that the blood be thoroughly washed out of the vessels. If it is necessary to preserve the specimens before photographing them, they should be injected with a 5% solution of formalin before introducing the mercury. It is necessary to place the part in the position in which it is to be photographed before introducing the mercury, otherwise the column of mercury is apt to be disturbed by movement of the part and distorted figures will result. A small skin-incision is to be made at the end of one of the digits, and when the mercury appears on the cut surface the injection is to be stopped; otherwise the fluid will pass through the capillaries into the veins. The pressure should not exceed 30 mm. of mercury. Exposures must be somewhat longer than those needed in clinical work. Specimens prepared in this way may be used to show vascular anastomoses.

Staining the Axis-cylinders with Gold.—M. von Frey² describes a mode of staining nerve-fibers in mucous membrane, integument, or viscera. Small pieces of tissue are placed in a 2% aqueous solution of ammonium bichromate, where they remain for 2 weeks at a temperature of from 1° to 5° C. Then they are washed in running water for 10 to 15 minutes, after which they are placed in a 10% solution of gold chlorid, to which 10% of hydrochloric acid has been added; here they remain sufficiently long to become properly stained, the length of time necessary being ascertained by experiment. The tissue is then washed, and the reduction of the gold is accomplished with a $\frac{1}{50}$ % aqueous solution of chromic acid. After 24 hours sections may be cut. Sodium hyposulphite solution may be used to remove superfluous gold. The axis-cylinders are stained a bluish-green to a bluish-black by this method.

A Modified Fixing-fluid for General Histologic and Neurohistologic Purposes.—A. P. Ohlmacher³ recommends the following modification of Carnoy's fluid: Anhydrous alcohol, 80 parts; chloroform, 15 parts; glacial acetic acid, 5 parts; corrosive sublimate to saturation. The anhydrous alcohol is prepared by dehydrating 95% alcohol with anhydrous copper sulphate. From 15 to 30 minutes is sufficient time for the fixation of ordinary pieces of tissue; 18 to 24 hours are sufficient for the brain.

A Method of Injecting the Lymphatic Vessels.—C. H. Leaf⁴ prepared a cadaver by injecting into the internal jugular vein and common carotid artery 11 gallons of formalin solution (1 part of formalin to 7 parts of water) and about 2 pints of spirit during a period of 1 month. The idea was to use so great an amount of pressure that some of the fluid would find its way into the lymphatic vessels. Upon dissecting the inguinal region the lymphatic vessels passing to and from the glands appeared as semitransparent, whitish cords, which could be traced a considerable distance down the limb. The author surmises that part of the formalin solution passed directly into the lymphatic vessels and partly distended them; but the greater part of the solution passed into the subcutaneous tissue and hardened the fat in which the vessels lay, as well as the vessels themselves, thus rendering them plainly demonstrable. He describes direct communications between the veins and lymphatic vessels in the inguinal region.

¹ Jour. Anat. and Physiol., vol. xii., part i., p. 83, 1897.

² Arch. f. Anat. u. Entwickl., Suppl., Band, S. 108, Dec., 1897.

³ Jour. Exper. Med., 1897.

⁴ Lancet, p. 1680, June 18, 1898.

PHYSIOLOGY.

By G. N. STEWART, M. D.,
OF CLEVELAND, OHIO.

Epitome.—[Among the more important researches that have appeared since our last report are the work of Delezenne on the coagulation of the blood; of Hedin, Hamburger, Loeb, and others on the osmotic relations of the blood-corpuscles and other animal cells; of Asher and Barbéra and of Spiro on the properties and formation of lymph; the investigations of Langendorff, Porter, Hedbom, etc., on the isolated mammalian heart; the exact proof by Kühne of the necessity of oxygen for the vital movements; the further evidence adduced by Haldane and Smith in favor of the "secretion" of oxygen by the lungs; the examination of the movements of the stomach with the aid of the Röntgen rays by Cannon (at the suggestion of Bowditch) and by Roux and Balthazard; the experiments of Waymouth Reid on absorption from the intestine; of Stadelmann on the circulation of the bile; of Dastre and Floresco on the relation of the liver to iron and of the hepatic iron to the hepatic pigments; and of Howell and Cyon on the functions of the hypophysis. St. Apáthy's histologic results on the structure of the conducting elements of the central nervous system, and Weigert's on the structure of the neuroglia, are also of great interest, as are Langley's experiments on the regeneration of sympathetic nerve-fibers, and those of Sherrington, Horsley and Löwenthal, and Hering on the coordination of muscular movements. A few of the more important additions to our knowledge in the domain of electrophysiology are summarized at the end of this article.]

BLOOD, LYMPH, AND CIRCULATION.

Coagulation of Blood.—[It is well known that anticoagulant substances of the peptone-group when injected into the circulation cause a great diminution in the number of leukocytes in the blood. Some observers believe that the leukocytes are actually destroyed; others, that they merely pass out of the vessels.] The former view is supported by the experiments of C. Delezenne;¹ although he admits that the redistribution of the leukocytes, brought about by the dilatation of the small vessels and the consequent slowing of the blood-stream, is a contributory cause. He considers² that the leukocytes play an essential rôle in the production of the anticoagulant substances in the liver after the injection of "peptone." According to his [rather too "schematic"] explanation, certain products of their decomposition—the anticoagulant histon and the coagulant leukonuclein—are carried to the liver, whose cells eliminate the leukonuclein in the interest of the organism, but permit the histon to remain in the circulation. He thinks it unnecessary to assume that the liver produces a new anticoagulant substance. [But his ex-

¹ Arch. de Physiol., p. 508, July, 1898.

² Ibid., p. 568.

periments, in our opinion, do not, when fairly interpreted, render such an assumption superfluous]; and, indeed, it has been shown by J. E. Abelous and G. Billard¹ that the liver of certain invertebrates (crayfish and lobster) normally contains such an anticoagulant body. The experiments of Kanthack on the influence of cobra-poison on the clotting of blood, and the action of Calmette's "antivenomous serum" in neutralizing it, have been followed up by J. W. W. Stephens and W. Myers.² Their most interesting results are that the same amount of the "serum" is necessary to neutralize a given quantity of poison outside of the body and in the circulation; and that the neutralization *in vitro* must be a chemical and not a vital or cellular action.

Osmotic Pressure and Electrical Conductivity of Blood.—[The molecular relations of the liquids and cells of the body, as revealed by measurements of the osmotic pressure and electrical conductivity, are beginning at last to awaken an amount of attention proportional to their importance.] P. Botazzi³ states that the osmotic pressure of blood is scarcely altered when it is laked by alternate freezing and thawing or by dilution. H. J. Hamburger,⁴ on the other hand, asserts that while this is approximately true for horse's blood, it does not hold for pig's blood. And G. N. Stewart⁵ finds that both the electric conductivity and the osmotic pressure of blood (dog, pig, hen, goose) are markedly altered by laking in certain ways (dilution with water, addition of saponin in sufficient quantity to cause rapid laking, heating the blood to 60° to 65° C.), and at first but little affected by laking in other ways (freezing and thawing, putrefaction, the addition of a foreign serum). Continued action of the laking agent causes ultimately here too an increase both in the osmotic pressure of the serum and the conductivity of the blood.

Permeability of the Corpuscles.—S. G. Hedin,⁶ continuing his researches on the permeability of the red corpuscles, divides the ammonium salts into two groups: A group which, like the chlorid, possesses the power of ready penetration, and a group which, like the sulphate, only penetrates with difficulty. [The author of this abstract, from observations on the electric conductivity and freezing-point of blood to which ammonium chlorid had been added, can confirm Hedin's assertion that that salt easily permeates the corpuscles. Sodium chlorid and cane-sugar, on the contrary, do not.] Hamburger⁷ shows that dilute acids cause swelling and dilute alkalies shrinking of the corpuscles, both white and red. He attributes the passage of hemoglobin out of the red corpuscles, when their increase in volume reaches a certain limit, merely to the increase in the distance of the particles of the protoplasmic framework. [But this can hardly be a complete explanation. For under various conditions hemoglobin may escape from the corpuscles, while inorganic salts and their ions are refused passage; and it does not appear that the blood-pigment can pass back from the serum into the corpuscles and "dye" them, as ought to be the case if it was merely a matter of widening or narrowing of the pores in the envelope.]

Alkalinity of the Blood.—The influence of various conditions on the alkalinity of the blood (estimated by Loewy's method in the laked blood) has been investigated by F. A. Foderà and M. Ragona.⁸ They find [in accordance with previous observers] that in herbivora (rabbit) it is much easier to alter artificially the alkalinity of the blood—for example, by alterations in the food

¹ Compt. rend. de la Soc. de Biol., p. 991, Nov. 20, 1897, and p. 1078, Dec. 18, 1897.

² Proc. Physiol. Soc., May 7, 1898; Jour. of Physiol., vol. xxiii.

³ Lo Sperimentale, vol. li., 3, p. 11; Centralbl. f. Physiol., Band xii., S. 8, Apr. 2, 1898.

⁴ Arch. f. Physiol., S. 486, 1897.

⁵ Proc. Brit. Med. Assoc., 1897 and 1898.

⁶ Pflüger's Arch., Band lxx., S. 525.

⁷ Arch. f. Physiol., S. 31, 1898.

⁸ Arch. Ital. de Biol., t. xxix., 1, p. 34; Centralbl. f. Physiol., Band xii., S. 475, 1898.

or direct administration of acids or alkalies—than in carnivora (dog). [Salkowski showed long ago that in herbivora inorganic acids introduced into the stomach are excreted in the urine combined with fixed alkalies already present in the blood, which accordingly becomes poorer in alkali.] H. Winterberg¹ brings forward evidence that, in addition, in herbivora a certain amount of ammonia is produced from the proteids, which also goes to neutralize the acids; but this capacity of splitting off ammonia from the proteids is much better developed in carnivora like the dog; although here, too, the limit may be overstepped and the alkalinity of the blood be markedly reduced by large doses of mineral acids. S. Salaskin² states that arterial blood of the dog normally contains a very constant amount of ammonia. During digestion the blood of the portal vein contains several times as much; but the excess disappears in the liver. If in the dog an artificial connection is made between the portal vein and the inferior vena cava (Eck's fistula), and the blood prevented from passing through the liver, certain characteristic symptoms of poisoning appear when the animal is fed with food rich in proteid. Salaskin [very plausibly, we think] explains these as due to saturation of the organism with ammonia, which is no longer built up into urea by the liver; but it would seem (Rumpf and Kleine³) that a certain amount of ammonia, even when given in the form of an inorganic salt, can be burned in the body. Chloroform appears to cause a diminution in the alkalinity of the blood (Thomas⁴); and acute alcoholic intoxication has a similar effect, owing to the production of volatile fatty acids. [It is possible that the use of ammonia after a drinking-bout, for the "bracing" effect attributed to it by experienced toppers, may be explained by its power of neutralizing these acid products.]

Number of the Blood-corpuscles.—W. Schwinge⁵ publishes an extensive series of observations on an already well-worn, although by no means exhausted, theme—the variations in the amount of hemoglobin and in the number of the corpuscles between infancy and old age. He finds [as others have done] that the number of red corpuscles and the proportional amount of hemoglobin are both at their maximum immediately after birth. They rapidly decline to a minimum, and then increase again during the period of growth. The leucocytes, on the contrary, diminish while growth is going on.

Functions of Leukocytes.—Ranvier⁶ sums up, in an important paper, his views on the functions of the leukocytes. He objects to the use of the term "phagocytes," since leukocytes have other functions than phagocytosis, and functions that are of greater consequence to the organism. In inflammation, for instance, he sees in the breaking up of the emigrated leukocytes a mechanism by which the actively proliferating tissue-cells are provided with the copious supply of nutritive materials which they require.

Composition of Blood.—E. Abderhalden⁷ contributes a mass of elaborate comparative analyses of the blood and serum of various animals, carried out in the laboratory of Bunge [who is himself an expert on this subject]. Among other interesting results may be mentioned the astonishing agreement in the composition of the serum of different animals, and especially of different individuals of the same species; and the close resemblance in the composition of the entire blood of different species belonging to the same great animal groups. For instance, the blood of the cow comes much closer in composition

¹ Zeit. f. physiol. Chem., Band xxv., S. 202.

² Ibid., p. 449.

³ Zeit. f. Biol., Band xxxiv., S. 65, 1897.

⁴ Arch. f. exper. Path. u. Pharmacol., Band xli., S. 1, 1898.

⁵ Pflüger's Arch., Band lxxiii., S. 299, 1898.

⁶ Compt. rend. de l'Acad. des Sci., Feb. 22, 1897; Pacific Med. Jour., July, 1897.

⁷ Zeit. f. physiol. Chem., Band xxv., S. 65.

to the blood of its fellow-ruminant, the goat, than to the blood of the carnivorous dog or cat.

Lymph.—An important contribution to our knowledge of the mode of formation and properties of the lymph has been made by L. Asher and A. G. Barbèra.¹ They find that defibrinated lymph injected into the carotid artery of a dog produces marked effects on the circulation (Traube-Hering curves, paralysis, or in some cases stimulation of the vagus), and that these effects are not produced by injection of defibrinated blood. They conclude that the common doctrine that lymph is simply a diluted blood-plasma is erroneous, and attribute the toxic effects to products of metabolism of the tissues which have found their way into the lymph. To the lymph-glands they assign the function of transforming these toxic bodies into harmless substances. Lymph, they say, far from being a mere filtrate, or even a secretion, from the blood, is formed by the activity of the organs—for example, the liver and other glands and the muscles—and may actually be absorbed by the blood from the tissue-spaces. In fact, according to their views, the intravenous injection of lymphagogues, both crystalloid and colloid, only causes an increased flow of lymph in so far as it leads to increased glandular secretion. The injection of “peptone,” for instance, is followed by a greatly increased secretion of bile, and with this increase in the work of the liver is associated the production of a greater quantity of lymph by its cells. [They conclude that this fact deprives the secretion-theory of lymph-formation of its strongest prop. But if the experiments are sound, and confirmation of them must be awaited, they militate only against the secretion-theory of Heidenhain, who looked upon the endothelial cells of the capillary walls as the active agents in the formation of the lymph; they involve, in fact, a new secretion-theory, in which the active agents are the tissue-cells in general and particularly the glandular epithelium. While the paper is interesting and suggestive in a high degree, the current doctrine, that the cells feed themselves from the lymph and not directly from the blood, is not grappled with, although it would seem almost necessary to refute it in order to establish the contention that the lymph is a product of the activity of the organs.] The experiments of Spiro² on the influence of colloid substances, such as albumose, on the flow of the lymph, which he considers to furnish evidence against the secretion-theory, seem also to be capable of another interpretation. [He assumes that such substances exert a sensible osmotic pressure. But it is highly doubtful whether the observations of Cohnstein and Starling, on which he bases this assumption, ought to be accepted, since it is not certain that the colloids worked with were absolutely free from salts; and the presence of a small quantity of salts would be sufficient to account for the observed osmotic pressures. The freezing-point of even a strong solution of hemoglobin is very little below that of distilled water.]

The Heart.—[The physiology of the heart has in the past year again attracted a large amount of attention.] The myogenic origin of the beat is upheld by F. Botazzi,³ though doubted by H. Kronecker.⁴ [While the arguments on the two sides are ably presented in both of these papers, we see no reason to modify the view we expressed in the YEAR-BOOK for 1898, that the evidence in favor of the myogenic origin is steadily growing. Nor does the difference in the ease with which fibrillary contraction can be excited in the

¹ Zeit. f. Biol., Band xxxvi., S. 154, 1898.

² Arch. f. exper. Path. u. Pharmacol., Band xli., S. 148.

³ Lo Sperimentale, vol. li., 2; Centralbl. f. Physiol., Band xii., S. 21, 1898.

⁴ Zeit. f. Biol., Band xxxiv., S. 529, 1897.

ganglion-free apex and in the rest of the mammalian heart furnish any real argument in favor of the ganglionic origin of the beat, as O. Langendorff¹ has supposed, for it is at least as likely to depend on a difference in the properties of the muscular fibers as on a difference in the distribution of the ganglion-cells.] And Bötke² has, indeed, found that it is impossible to produce fibrillary contraction in the frog's heart at the ordinary temperature in spite of the presence of ganglion-cells; while at a temperature of 30° to 34° C. fibrillary contractions of the same character can be elicited in the apex as in the rest of the heart. This would seem to indicate that the excitability of the muscular fibers is a determining factor in the onset of fibrillary contractions, as it probably is also in their disappearance, since W. T. Porter³ has shown that a dog's heart in which fibrillary contractions have been set up [and these contractions are well known to persist most stubbornly in the dog's heart] will recover if it is cooled and fed with defibrinated blood. Numerous additional researches on the isolated mammalian heart show that the long-deferred hope that the heart of warm-blooded animals might become as accessible to physiologic experiment as the skeletal muscles or the frog's heart, has at last been approximately realized. O. Langendorff,⁴ working with the isolated cat's heart, finds evidence that the heart possesses not only a certain stability of rhythm [as is well known from the phenomenon of the compensatory pause that follows an extra contraction], but also a certain steadiness of working-power, the increased strength of the systole following an extra contraction just making up for the work lost by the appearance of the extra contraction. W. T. Porter⁵ and F. H. Pratt⁶ have shown that it is possible to supply the heart, through the veins of Thebesius and the coronary veins, with a sufficient supply of blood for the maintenance of its beat. Even serum will suffice when the organ is immersed in oxygen at high pressure. Hedbom,⁷ using a modification of Langendorff's method, has investigated the action of various alkaloids and animal extracts on the isolated heart in the cat and rabbit. Extract of testicle, of suprarenal capsule, and of submaxillary gland he found to strengthen the beat, and extract of spleen to increase the tone of the heart-muscle. J. Bock,⁸ by means of a modification of Newell Martin's method [in which an artificial circulation is kept up through the isolated heart and lungs], has shown that chloroform given by inhalation causes a marked decrease in the blood-pressure, due to a direct action on the heart, which beats more slowly. Haloid-free compounds, such as ether, alcohol and pentol, have little influence on the isolated mammalian heart, and amyl nitrite [as Brunton has long maintained] none at all. The announcement of Botscharoff, confirmed by S. Schmidt,⁹ that chloroform given by inhalation produces histologic alterations in the ganglion-cells of the heart, might be thought to afford an explanation of these results. But all statements as to ganglion-cells in the mammalian heart must be revised in the light of the careful observations of S. Schwartz,¹⁰ who finds that true ganglion-cells are confined (in the rat's heart) to an area on the posterior wall of the auricles. The numerous cells scattered over the surface of the heart, which many writers have described as ganglion-cells, he considers not to be nerve-cells at all.

¹ Pflüger's Arch., Band lxx., S. 281, 1898.

² Am. Jour. Physiol., vol. i., p. 71, 1898.

³ Am. Jour. Physiol., vol. i., p. 511.

⁴ Skandinavisches Arch. f. Physiol., Band viii., S. 147.

⁵ Arch. f. exper. Path. u. Pharmacol., Band xli., S. 158.

⁶ Verhandl. d. Berlin. physiol. Gesellsch.: Arch. f. Physiol., S. 533, 1897.

⁷ Arch. f. mikr. Anat. u. Entwickl., Band liii., S. 63, 1898.

⁸ Ibid., Band lxxi., S. 412.

⁹ Pflüger's Arch., Band lxx., S. 473, 1898.

¹⁰ Ibid., p. 86.

Pulse-rate and Muscular Work.—Athanasii and Carvallo¹ bring forward evidence that the acceleration of the heart which accompanies and follows muscular work is not caused by mechanical or chemical respiratory changes, but by nervous impulses passing up from the active muscles to the vagus-center in the spinal bulb. In prolonged work there may also be some chemical action produced by certain toxic substances developed in the muscular contraction. The relation between the amount of work done and the increase in the pulse-rate has been elaborately investigated by A. Staehelin.² In general the increase in the pulse-rate is greater for a large than for a small amount of work; but, as H. Christ has pointed out, there is no absolute proportionality between the two, and there are marked individual variations. The highest pulse-rate seen was 156 per minute. G. N. Stewart,³ in observations on 74 healthy men, saw a maximum rate of 164, and an average increase of 32 beats per minute.

Vasomotor Nerves.—F. W. Bancroft⁴ has traced the course of the nerve-fibers (venomotor fibers) whose stimulation, as Thompson first showed, causes constriction of the superficial veins of the posterior extremity. In general their arrangement is similar to that of the arterial vasomotor fibers and sweat-fibers; but their origin from the spinal cord is more restricted. P. Maas⁵ confirms Porter's statement that vasomotor fibers for the heart exist in the vagus, and asserts the presence of vasodilators as well. [But this assertion must still be regarded as *sub judice*.] A. G. Barbèra⁶ has convinced himself that a vasomotor center exists in the dog's heart, which, he says, can recover of itself from fibrillary contractions if this center is paralyzed. [This statement has been made by others, but the evidence is not sufficient.]

Blood-pressure.—L. Hugounenq and M. Doyon⁷ find the immediate cause of death after injection of diphtheria-toxin in the marked lowering of blood-pressure due to paralysis of the vasomotor center and enfeeblement of the cardiac muscle. Intravascular injection of saline solutions is of temporary benefit, and may, perhaps, in certain cases, have a therapeutic value.

Mott and Halliburton⁸ report that the fall of arterial pressure produced by the injection of cerebrospinal fluid obtained from cases of brain-atrophy (especially from cases of general paralysis of the insane) is caused by cholin in the fluid, and is due to dilatation of the arterioles, particularly in the splanchnic area.

L. Hill⁹ makes a further communication on the syncope produced in rabbits by suspension in the feet-down position. He shows that it is associated with cerebral anemia caused by draining of the blood into the abdominal vessels; and it is much easier to obtain syncope in tame rabbits, which have been kept in a hutch, and whose abdominal walls are lax, than in wild rabbits with their tense abdominal walls.

I. Ronsse¹⁰ remarks that in nonnarcotized animals removal of comparatively small quantities of blood (1% of the body-weight in the dog; $\frac{1}{2}$ % in the rabbit) causes a fall of blood-pressure which lasts for a considerable time. [This is in opposition to the statements of a large number of previous observers. The discrepancy is probably to be explained by the fact that other investigators have, in general, used animals under the influence of an anes-

¹ Arch. de Physiol., pp. 347 and 552, 1898.

² Deutsch. Arch. f. klin. Med., Oct., 1897.

³ Manual of Physiology, 3d edition, London, 1898.

⁴ Amer. Jour. Physiol., vol. i., p. 477.

⁵ Pflüger's Arch., Band lxxi., S. 399.

⁶ Zeit. f. Biol., Band xxxvi., S. 239.

⁷ Arch. de Physiol., p. 386, 1898.

⁸ Proc. Physiol. Soc., Feb. 12, 1898; Jour. of Physiol., vol. xxii., p. xxxiv.

⁹ Proc. Physiol. Soc., Mar. 12, 1898; Jour. of Physiol., xxii., p. liii.

¹⁰ Centralbl. f. Physiol., Band xii., S. 377, Sept. 3, 1898.

thetic. In dogs anesthetized with morphin and ether, as the author of this abstract has had frequent opportunity to observe, the fall of pressure, even after a quantity of blood equal to 2-3% of the body-weight has been removed, is comparatively slight and transient.]

Hill and Barnard¹ state that with their new sphygmometer² [which seems exceedingly practical and well adapted to clinical use] it is easy to demonstrate a fall of arterial pressure during rest and sleep and during chloroform-anesthesia. In ether-anesthesia there is either no fall of pressure or it is very slight. During muscular exertion there is a rise of pressure, unless the work is severe, when there is a fall. The normal arterial pressure in healthy young men is 110 to 130 mm. of mercury in the brachial artery in the sitting position. These results agree very well with the direct manometric measurements of Zuntz and Tangl³ on nonnarcotized dogs which were allowed complete freedom of movement. Hill⁴ criticises the assumption of Howell,⁵ that sleep is due to anemia of the brain produced by fatigue of the vasomotor center. [And, indeed, there does not appear to be any good reason for believing that the vasomotor center is more susceptible of fatigue than the higher cerebral centers. It would seem probable that the cortical centers enter into the condition known as sleep because they become fatigued, rather than because they become anemic.]

The phenomena of the intracranial circulation are discussed by G. Elder,⁶ V. O. Sívén,⁷ and W. H. Howell.⁸ Howell finds that an increase in the arterial pressure always causes an increased flow of blood through the brain, just as it does through other organs; and Sívén concludes that the chief factor in the production of the respiratory movements of the brain, which have so long been one of the puzzles of the circulation, is the respiratory alteration in the arterial blood-pressure.

Velocity of the Blood.—G. N. Stewart⁹ finds that in dogs anesthetized with morphin and ether the mean velocity of the blood is considerably less than has usually been supposed. The mean velocity, for example, for the whole distance between the origin of the aorta and the crural artery in the middle of the thigh does not exceed 100 mm. per second.

RESPIRATION.

Absorption of Oxygen.—Working with a modified Regnault and Reiset apparatus, J. Rosenthal¹⁰ has come to the [heterodox] conclusion that the amount of oxygen taken up is not independent of the pressure of the oxygen. [There is too much evidence on the other side for this result to be lightly accepted, and confirmation of it must be awaited.]

J. Haldane and J. Lorrain Smith¹¹ have extended to animals their new method of measuring the oxygen-tension in human blood (see YEAR-BOOK for 1898), and have compared it with the aërotonometer method. Among other interesting results, they find that when the proportion of oxygen in the alveolar air is diminished the relative excess of the oxygen-tension in the

¹ Proc. Physiol. Soc., Jan. 15, 1898; Jour. of Physiol., vol. xxii.; Proc. Physiol. Soc., May 7, 1898; Jour. of Physiol., vol. xxiii., p. iv.; Brit. Med. Jour., Oct. 2, 1897.

² Made by Hicks, 8 Hatton Garden, London, E. C.

³ Pflüger's Arch., Band lxx., S. 544.

⁴ Jour. Exper. Med., vol. ii., p. 313, 1897.

⁵ Lancet, Jan. 29, 1898.

⁶ Brit. Med. Jour., p. 1414, Nov. 13, 1897.

⁷ Zeit. f. Biol., Band xxxv., S. 481, 1897.

⁸ Am. Jour. Physiol., vol. i., p. 57, 1898.

⁹ Loc. cit., p. 115.

¹⁰ Verhandl. d. Berlin. physiol. Gesellsch.; Arch. f. Physiol., S. 271, June, 1898.

¹¹ Jour. of Physiol., vol. xxii., p. 231.

arterial blood over the alveolar oxygen-tension is markedly increased. In this they see a strong proof that oxygen is in part absorbed by the lungs by some process analogous to secretion. Lorrain Smith¹ finds further evidence in proof of this contention in the lowering of the arterial oxygen-tension in general pathologic conditions produced—*e. g.*, by bacterial toxins, and particularly in local pathologic conditions affecting the lungs. [Bohr had previously expressed the same view as regards both the absorption of oxygen and the elimination of carbonic acid; and so far as can be seen at present, it seems difficult to explain all the facts without some "secretory" hypothesis.]

B. Werigo,² however, while accepting Bohr's statement that the tension of carbonic acid in the expired air may exceed that of the blood, does not believe that this necessarily compels the acceptance of his theory of gaseous secretion, for oxygen causes the compound which, according to Bohr, carbonic acid forms with hemoglobin to be broken up, and therefore the actual tension of carbonic acid in the blood of the pulmonary capillaries may be greater than that deduced from experiments with the aërotonometer. And he states that when, by means of a double cannula, one lung of a rabbit was connected with a reservoir of oxygen and the other with a reservoir of hydrogen, the percentage of carbonic acid was always found highest in the alveolar air of the lung which had been breathing oxygen. [But apart altogether from the fact that the existence of Bohr's compound of hemoglobin and carbonic acid is still in doubt, Werigo's conclusion is not the only one which might be drawn from his experiment, for it is open to the advocates of the secretion-hypothesis to say that the presence of oxygen in the alveoli is necessary to the full secretory activity of the pulmonary endothelium. Or, since Bohr and Henriques have shown that a considerable amount of combustion goes on in the lungs, it is possible that less carbonic acid may be produced by this local oxidation in a lung which is breathing hydrogen than in a lung which is breathing oxygen.] The same considerations nullify Werigo's attempted explanation, on the diffusion-theory, of the results of A. Rodet and J. Nicholas³ on the injection of gaseous mixtures into the cellular tissue and the peritoneal cavity. After injection of pure carbonic acid they sometimes found as much as 25% of oxygen in the mixture [corresponding to a tension greater than the partial pressure of the oxygen in atmospheric air. If these results were to be confirmed, and they certainly need confirmation, they would suggest that the active "secretion" of gases is perhaps a function of the endothelium of the capillaries in general].

W. Kühne⁴ has published an important paper on the significance of oxygen for the vital movements in the protoplasm of plants. By the adoption of extraordinary precautions he was able to get rid of the last traces of oxygen, and then found that the movements (in *Nitella*) came to an end. The stubbornness with which the movements persist depends not only on the presence of oxygen in the water or in the tissues of the plant, but also on the presence of carbonic acid, which the chlorophyll decomposes under the influence of light. The oxygen thus set free is sufficient to start again the movements when they have disappeared in a plant kept in the dark in a completely sealed chamber, and to maintain them for a long time.

Carbonic Oxid.—N. Gréhant⁵ has determined the quantity of carbonic oxid taken up by the blood from gaseous mixtures containing that gas in definite small proportions. [That a certain amount of carbonic oxid is contained

¹ Jour. of Physiol., vol. xxii., p. 307.

² Ibid., p. 28, 1898.

³ Arch. de Physiol., S. 610, 1898.

⁴ Zeit. f. Biol., Band xxxvi., S. 425, 1898.

⁵ Arch. de Physiol., p. 315, 1898; Compt. rend. de l'Acad. des Sci., Nov. 8, 1897.

in normal blood has been asserted by various authors, including Saint-Martin.] M. Nicloux¹ now confirms this statement, and shows, further, that the carbonic oxid does not come from the air, but is formed in the organism. In chloroform-anesthesia, according to A. Desgrez and M. Nicloux,² the amount of carbonic oxid in blood is notably increased, owing to a partial decomposition of the chloroform in the body, one of the products being carbonic oxid.

DIGESTION AND ABSORPTION.

Deglutition.—W. B. Cannon and A. Moser,³ by mixing with the food bismuth subnitrate, which is opaque to the Röntgen rays, have been able to see through a fluorescent screen the progress of the bolus along the esophagus. Their results differ in certain respects from the latest results of Meltzer;⁴ but some of the differences appear to depend on the fact that the process of deglutition is not the same in all animals, nor even in all mammals. They agree with Meltzer that in man liquids are shot at a very rapid rate, by contraction of the mylohyoid muscles, into the lower portion of the esophagus [according to Meltzer, not to the very bottom of the tube]. Solids are carried slowly by peristalsis along the whole esophagus.

The movements of the stomach have been investigated by Cannon;⁵ and independently by J. C. Roux and V. Balthazard⁶ by the same method. The most important outcome of these observations is a new proof of what Meltzer and others had already indicated, that the fundus-portion of the stomach takes but a small part in the movements of the organ, which are ordinarily confined to the antrum pylori and the portion of the fundus next the transverse band that marks the boundary of the antrum. A few minutes after food is taken contractions begin in the antrum, and run on in constricting waves (in the cat at the rate of 6 in the minute) toward the pyloric sphincter.

Intestines.—P. Grünzner⁷ again asserts (and backs his assertion by new experiments) that liquids containing small particles in suspension may pass from the rectum (in man and mammalian animals) beyond the ileocecal valve and even into the stomach.

Courtade and Guyon,⁸ in relating their experiments on the motor innervation of the large intestine, make the assertion that the inferior mesenteric ganglion is a reflex center for the circular fibers of the rectum. [But in the light of Langley and Anderson's work on the so-called reflex function of this ganglion for movement of the bladder, we would recommend caution in accepting this statement.]

Enzymes.—[Von Wittich first showed that fibrin possesses the power of fixing enzymes, such as pepsin.] De Szumowski⁹ has investigated this property in detail, and finds that it belongs in some degree even to boiled fibrin. N. Chodschajew¹⁰ answers the old question whether enzymes are dialyzable in the affirmative, and von Moraczewski¹¹ the question whether the enzyme-action is abolished by substances that precipitate calcium, in the negative.

Gastric Juice.—A. Charrin¹² finds that digestion with pepsin and hydrochloric acid causes an appreciable destruction or attenuation of diphtheria-

¹ Arch. de Physiol., p. 434, 1898.

² Ibid., p. 377.

³ Am. Jour. Physiol., vol. i., p. 435, 1898.

⁴ Jour. Exper. Med., vol. ii., p. 453, 1897.

⁵ Am. Jour. Physiol., vol. i., p. 359.

⁶ Compt. rend. de la Soc. de Biol., p. 704, July 10, 1897; Arch. de Physiol., p. 85, 1898.

⁷ Pflüger's Arch., Band lxxi., S. 492, 1898.

⁸ Compt. rend. de la Soc. de Biol., pp. 745 and 792, 1897.

⁹ Arch. de Physiol., p. 160, 1898.

¹⁰ Ibid., p. 241.

¹¹ Pflüger's Arch., Band lxxix., S. 32, 1897.

¹² Arch. de Physiol., p. 67, 1898.

toxin. According to Chittenden, Mendel, and Jackson,¹ alcohol and alcoholic beverages greatly increase the flow of saliva and gastric juice; and this effect may counterbalance, or more than counterbalance, their retarding influence on chemical digestion.

Duodenal Digestion.—J. Gachet and V. Pachon² announce that the secretion of the glands of the duodenum digests coagulated albumin, though its proteolytic powers are less than those of the pancreatic juice.

Bile.—Dastre and Floresco³ have made an important addition to our knowledge of the pigments of the liver (as distinguished from the pigments of the bile). They divide these hepatic pigments (both in vertebrates and invertebrates) into two classes: (1) Pigments soluble in water, insoluble in alcohol and chloroform, and consisting of mixtures of an iron-containing compound, which they term "ferrin," with a small quantity of iron-containing nucleoproteids. (2) Pigments soluble in alcohol and chloroform, insoluble in water, and containing no iron. E. Stadelmann⁴ bases on an elaborate review of previous work and numerous fresh experiments the statements that a circulation of the bile-acids [*i. e.*, an absorption from and reexcretion into the intestine] is proved; that a circulation of the bile-pigments is probable; that a circulation of the cholesterin of the bile does not take place at all. With the view of determining the mechanism of absorption of the bile-pigments in obstructive jaundice, E. Wertheimer and L. Lepage⁵ have continued the work already reported (see YEAR-BOOK for 1898). They find that bilirubin injected into a bile-duct appears sooner in the urine than in the lymph of the thoracic duct, and therefore conclude that the blood-vessels are the most important channel for its absorption. [But we have to repeat the criticism we made last year, that the pressure under which the bilirubin was injected might have been sufficient to cause rupture of some of the hepatic capillaries and direct entrance of the bile-pigment into the blood. In any case the pigment appears only a little later in the lymph; and it would seem that the truth is most likely to lie in a compromise between the old view (originated by Magendie) of exclusive absorption by the lymphatics and the theory of exclusive absorption by the blood-vessels. It is probable that both are concerned, at any rate, when the pressure of the bile in the bile-capillaries rises above a certain limit.]

Comparative Physiology of Digestion.—W. Biedermann and P. Moritz⁶ have discovered a cellulose-dissolving enzyme (cytose) in the hepatic secretion of the snail; and K. Knauth⁷ in the hepatopancreas of the carp. Extracts of the latter rapidly dissolved filter-paper.

Absorption.—[It seems to be becoming more difficult than ever to explain absorption from the alimentary canal on any merely physical theory.] For example, Waymouth Reid⁸ has shown that the water, inorganic and organic solids of the serum of a dog are absorbed from a loop of its intestine when the pressure in the capillaries of the intestinal wall is considerably greater than in the cavity of the gut. The absorption in this case cannot be due to filtration. Since the serum in the intestine must be practically isotonic with and chemically identical with the plasma in the capillaries, the absorption cannot be due to ordinary osmosis or diffusion. O. Cohnheim⁹ comes also to the conclusion that

¹ Am. Jour. Physiol., vol. i., p. 164, 1898.

² Ibid., pp. 209 and 289.

³ Arch. de Physiol., p. 334, 1898.

⁴ Zeit. f. Biol., Band xxxiv., S. 1, 1897.

⁵ Pflüger's Arch., Band lxxiii., S. 219, 1898.

⁶ Verhandl. d. Berlin. physiol. Gesellsch.; Arch. f. Physiol., S. 147, 1897.

⁷ Proc. Physiol. Soc., Mar. 12, 1898; Jour. of Physiol., vol. xxii., p. lvi.

⁸ Zeit. f. Biol., Band xxxvi., S. 129, 1898.

there is some factor besides these ordinary physical processes involved in absorption from the intestine.

Cushny and Wallace,¹ too, in an investigation of the rate of absorption of isotonic solutions of various salts, carried out with the view of throwing light on the action of saline cathartics, find that the absorption of salts of the fixed alkalies varies with the acid constituent, those acids which form insoluble calcium salts tending to retard absorption more than the others. As regards the basic constituents of the salts, NH_4 is absorbed more rapidly than the fixed alkali ions. And R. Höber² states that the rate of absorption of isotonic solutions of various salts is very different. [But the important fact is often lost sight of by writers on this subject that solutions of different salts which freeze at the same temperature may not be really isotonic with regard to any given semipermeable membrane. It is not possible to eliminate osmosis as a factor in absorption from the intestine merely by choosing solutions of the same freezing-point as the serum, unless we know that the tissues of the intestinal wall are equally permeable by the salts introduced into the intestine and by the salts of the serum. The freezing-point observations only enable us to determine the osmotic pressure which the solution would exert on a membrane entirely impermeable to molecules of the salt.]

Absorption of Fat.—O. Frank³ announces that the ethyl "esters" of the higher fatty acids (with the exception of the stearic-acid compound) are completely split up in the intestine before their absorption, so that not a trace appears in the chyle. He considers his results a strong support to the view that all the neutral fat is split up in the intestine before absorption. [And, indeed, the work of Moore and other recent investigators compels us to abandon the common doctrine that only a small part of the fat is decomposed.]

METABOLISM, NUTRITION, AND DIETETICS.

Formation of Urea.—Doyon and Dufourt⁴ emphasize the importance of oxygen for the production of urea in the liver. When the afflux of arterial blood to that organ is actually suppressed by ligation of the hepatic artery and all its collaterals, the ratio of urea to total nitrogen in the urine sinks considerably. This is not the case when the portal vein is ligated. S. Salaskin⁵ brings formal proof, in the shape of exact perfusion-experiments on the isolated liver, of the [long-accepted] belief that amido-acids of the fatty series (glycol, leucin, asparaginic acid) are changed into urea in the hepatic cells.

Uric Acid.—K. Petren⁶ concludes from an exhaustive examination of the literature and experiments of his own that uric acid is either a constant or a very common constituent of normal human blood, while in certain diseases (gout, nephritis) it is present in increased amount.

Glycogenesis.—Seegen⁷ announces the discovery in the liver of a new carbohydrate, which he terms "liver-dextrin." Often there is more of it present than of glycogen and sugar. Lusk,⁸ and Lusk, Reilly and Nolan⁹ have investigated the effects of different kinds of sugar and of gelatin in diabetes caused by the injection of phloridzin. Dextrose is entirely excreted. Levulose is partly burned in the body [as is the case in pathologic diabetes in man]. Gelatin yields the same quantity of sugar as proteids do—viz., 60 gm.

¹ Am. Jour. Physiol., vol. i., p. 411, 1898.

² Pflüger's Arch., Band lxxi., S. 624, 1898.

³ Zeit. f. Biol., Band 36, S. 568, 1898.

⁴ Arch. de Physiol., p. 522, 1898.

⁵ Zeit. f. physiol. Chem., Band xxv., S. 128.

⁶ Arch. f. exper. Path. u. Pharmacol., Band xli., S. 265, 1898.

⁷ Centralbl. f. Physiol., Band xlii., Oct. 15, 1898.

⁸ Zeit. f. Biol., Band xxxvi., S. 82, 1898.

⁹ Am. Jour. Physiol., vol. i., p. 359, 1898.

of dextrose for 100 gm. of proteids. [There has been considerable controversy as to the effect of ligation of the bile-duct on the glycogenic function of the liver.] The latest contribution to the question is made by F. von Rensz,¹ who states that this operation always causes glycosuria in rabbits, although no notable change is produced in the amount of glycogen either in the liver or the muscles.

Z. von Vamossy² supports the conclusions of former observers, that in carbonic-oxid diabetes the sugar comes not from the carbohydrates, but from the proteids of the food and tissues. Confirming and extending the work of Rosenstein, he finds that, among the products of pancreatic digestion of proteids, "peptone" and leucin are inactive, while the monamido-acids cause excretion of sugar in animals made to breathe carbonic oxid. [But while his experiments may be good so far as they go, there are not enough of them.]

Formation of Fat.—O. Polimanti³ supposed he had given definite proof of a new formation of fat from proteids in frogs poisoned with phosphorus; but E. Pflüger⁴ adversely criticises his experiments and points out that the fat might have come from the stored-up glycogen. [The evidence, however, seems in favor of the possibility of the formation of fat from proteids.] According to W. Lummert,⁵ the chemical and physical properties of the fat deposited in the adipose tissue of an animal fed with a diet of carbohydrates and proteids as free as possible from fat, are identical with those of ordinary animal fat, although there are minor differences in the fat of the liver and of the blood. C. A. Herter,⁶ too, has shown by histologic examination that fat-starvation does not lead to marked serous atrophy of the fat of the subcutaneous tissue, if the animal be fed on a diet containing a considerable excess of the proteid and carbohydrate constituents of milk, but as free as possible from fat.

Iron.—According to Bunge,⁷ the iron-compounds in the bran of wheat are absorbed and used for the building up of hemoglobin. [Since most of the iron of the cereals is contained in the husk, this is a conclusion of considerable importance in dietetics.]

[Although it cannot be doubted that in all animals whose blood contains hemoglobin the iron found in the liver bears an important relation to the building up or breaking down of the blood-pigment, the injection of hemoglobin (Schurig⁸) or of hemin (Morishima⁹), indeed, increasing markedly the amount of iron in the liver, as well as in the spleen, bone-marrow, and other tissues; yet this does not seem to be the only function of the hepatic iron.] For Dastre and Floresco¹⁰ have shown that in invertebrates with colorless blood (crayfish, lobster) the liver is rich in iron. They remark [in somewhat transcendental fashion] that the function of this iron is probably to prevent organic combustion in the body. Some of the iron passes into the bile.

Phosphorus.—A. B. Macallum¹¹ describes a new microchemical reaction for phosphorus in the tissues. Sections are soaked in a mixture of ammonium molybdate and nitric acid and then treated with phenylhydrazin hydrochlorid, which causes the formation of dark-green molybdenum oxid in the cells.

Dietetics.—C. C. Stewart¹² has investigated the influence of various circumstances on the muscular activity of animals. The experimental fact [already sufficiently demonstrated on aldermen] that a rich diet decreases vol-

¹ Arch. f. exper. Path. u. Pharmakol., Band xli., S. 19, 1898.

² Ibid., p. 273.

³ Pflüger's Arch., Band lxx., S. 349; Arch. f. Physiol., S. 260, 1898.

⁴ Pflüger's Arch., Band lxxi., S. 318.

⁵ Ibid., p. 176.

⁶ Jour. Exper. Med., vol. iii., p. 293.

⁷ Zeit. f. physiol. Chem., Band xxv., S. 36, 1898.

⁸ Arch. f. exper. Path. u. Pharmakol., Band xli., S. 29.

⁹ Ibid., p. 291.

¹⁰ Arch. de Physiol., p. 176, 1898.

¹¹ Proc. Roy. Soc., vol. lxxiii., p. 467, June 16, 1898.

¹² Am. Jour. Physiol., vol. i., p. 40, 1898.

untary activity, is proved to hold true for rats also. To **alcohol**, however, the latter kind of animal was found unexpectedly refractory. No decrease in activity was produced by 20% solutions. Only when the alcohol was given in the form of a 20% to 60% solution was a marked diminution observed.

G. Baer¹ states that the toxicity of the alcohols increases with their boiling-point. Methyl alcohol, for example, is less toxic than ethyl alcohol, which again has only one-fourth of the toxic power of amyl alcohol.

C. F. Hodge² reports that only 20% of the offspring of bitches which had received for a long time a definite daily dose of alcohol were viable, as against 94% in the case of normal bitches. Further, in an epidemic of distemper the teetotal dogs had an enormous advantage as regards the severity of the attack, the promptitude with which they recovered, and the percentage of recoveries over the alcohol-consuming animals.

The question of the relative effects, on the amount of proteids consumed, of the taking of a given quantity of food as a single meal or in several meals distributed throughout the day, has been the subject of a lively controversy between I. Munk³ and O. Krummacher.⁴ [As reported in the *YEAR-BOOK* for 1896, Munk came to the conclusion that less proteid was consumed and more laid on with the single meal than with several meals. Krummacher has reached exactly the opposite result. The difference appears to depend, partly at least, on differences in the experimental conditions and in the statistical methods employed. The settlement of the dispute will doubtless be found in renewed investigation.]

M. Rubner and O. Henbner⁵ and Rubner⁶ have published very exact observations on the metabolism of the infant and of the adult on a milk-diet. The child was 9 weeks old and was fed exclusively on its mother's milk. The amount of carbonic acid and nitrogen excreted was estimated. The results show that in the child the absorption of the milk is exceedingly complete, over 91% of the total energy being utilized; while an adult taking as much cow's milk as is necessary for the maintenance of equilibrium does not utilize at most more than 84%.

The investigation of the **metabolism of the salmon** during the period when the reproductive organs are undergoing their development at the expense of the other tissues may be said to have formed the life-work of Miescher, whose collected researches have been published during the past year. Noël Paton and a number of his pupils,⁷ in an extensive research carried out at the instance of the Scottish Fishery Board, have added materially to our knowledge of this interesting subject. In certain respects they have corrected and in others enlarged the results of Miescher.

Muscular Work.—L. Zuntz⁸ has made some interesting observations on the production of carbonic acid in bicycle-riding. With a moderate speed, say 9 miles an hour, the expenditure of energy per mile is only about half as great as the expenditure of a pedestrian going at the ordinary rate; but as the pace is forced the amount of energy expended increases very rapidly, owing to the increase in resistance of the air.

Animal Heat.—J. Lefèvre⁹ continues his elaborate investigations on the effects of cooling on the distribution of heat in the body. He sums up against the ordinary opinion that in homoiothermal animals constancy of temperature

¹ Arch. f. Physiol., S. 283, 1898. ² Jour. Boston Soc. Med. Sci., vol. ii., No. 4, p. 35, 1897.

³ Centralbl. f. Physiol., Band xi., S. 729; Band xii., S. 41.

⁴ Zeit. f. Biol., Band xxxv., S. 481, 1897; Centralbl. f. Physiol., Band xii., S. 37.

⁵ Zeit. f. Biol., Band xxxvi., S. 1, 1898.

⁶ Ibid., S. 56.

⁷ Jour. of Physiol., vol. xxii., p. 333.

⁸ Pflüger's Arch., Band lxx., S. 346.

⁹ Arch. de Physiol., pp. 1, 254, 495, 685, 1898.

is a property only of the visceral region of the body. On the contrary, during life, so long as there is resistance to the external change of temperature, the skeletal muscles behave like the central core, and their temperature remains normal. Even the skin, flushed with blood, maintains its temperature at 15° to 20° C. above that of the bath. If the animal is small and the temperature of the bath low the period of resistance, of relative constancy of temperature, is very transient. Then follows the period of falling temperature, even in the central mass and the liver itself, and this ushers in the final stage of collapse. According to Krehl and Kratsch,¹ the temperature of the rabbit's liver in fever is higher than that of the blood in the root of the aorta, just as it is in health. They therefore conclude that the liver is a seat of increased heat-production in fever. [While this conclusion is probably correct, it does not follow from the data cited. For the liver might be heated by the portal blood if the muscular tissue or the glands of the alimentary canal were the seat of increased metabolism. And, further, the wall of the aorta, with which it would be difficult to prevent the thermometer from coming in contact, might be cooled by its contiguity to the lungs and might have a lower temperature than that of the arterial blood.]

N. Zunt² criticises [justly, we think] the conclusion of Chauveau³ that such quantities of fat and carbohydrates as can produce equal quantities of glycogen in the body have an equal nutritive value, and upholds his former result that fat and carbohydrates replace each other in the proportions of their heat-equivalents.

[The cause of the **daily variation of temperature** is one of the standing problems of physiology.] The latest contributions to the question are papers by J. E. Johansson,⁴ G. Hörmann,⁵ and M. Mühlmann.⁶ The first two observers find the chief causes in variations of the heat-production due to changes in the amount of muscular contraction and the taking of food [as many other writers on the subject have done. Jäger and Krieger showed long ago that in bakers who work at night and sleep during the day the curve of temperature is reversed]. Mühlmann lays stress on the change in the rate of heat-loss occasioned by variations in the temperature and degree of saturation of the air with aqueous vapor. [The truth appears to be that all of these causes, and possibly others, contribute to the changes in body-temperature; but the variation in the amount of muscular work is probably the most important of all.]

INTERNAL SECRETION.

Suprarenal Capsules.—Swale Vincent,⁷ finding that the eel survives removal of the capsules for a relatively long time, makes the [somewhat sweeping] induction that in the teleostean fishes the gland represents only the cortex of the mammalian gland [which, according to Oliver and Schäfer, contains little, if any, of the physiologically active substance]. The same author⁸ states that in rabbits and dogs the active principle of the capsules is not absorbed when taken into the stomach. [These experiments, so far as they go, indicate that administration of suprarenal extract by the mouth is inadmissi-

¹ Arch. f. exper. Path. u. Pharmacol., Band xli., S. 185.

² Arch. f. Physiol., S. 267, 1898.

³ Compt. rend. de l'Acad. des Sci., t. cxxv., No. 25, Dec. 20, 1897.

⁴ Scandinavisches Arch. f. Physiol., Band viii., S. 85, 1898.

⁵ Zeit. f. Biol., Band xxxvi., S. 319, 1898.

⁶ Pflüger's Arch., Band lxxix., S. 613.

⁷ Proc. Physiol. Soc., Mar. 12, 1898; Jour. of Physiol., vol. xxii., p. xlviii.

⁸ Ibid., p. lviii.

ble, in spite of the fact observed by Oliver and Schäfer that the active substance is not destroyed by gastric digestion *in vitro*. P. Langlois,¹ from the fact that extracts of the capsules of batrachians have the same physiologic effects as extracts of the mammalian capsules, concludes that the capsules of batrachians are homologous with those of mammals [a point which was in doubt]. W. Radziejewski² confirms the discovery of Gottlieb, that when the heart has been brought to a standstill by large doses of chloral hydrate it can be again caused to beat by injection of suprarenal extract combined with compression of the thorax. [This may have a bearing on the treatment of chloroform-poisoning.] He also emphasizes the importance of the extract in ophthalmologic practice [in which it was first used by Bates].

Pituitary Body.—W. H. Howell³ has separately investigated the action of intravenous injections of extracts of the anterior and posterior portions of the pituitary body, or, as he prefers to call them, the hypophysis cerebri and the infundibular body. Extracts of the hypophysis are inactive. Extracts of the infundibular body cause slowing of the heart and a rise of blood-pressure. If the vagi have been previously cut the heart is still slowed and the rise of pressure is great and prolonged. Very similar results have been obtained by E. v. Cyon,⁴ who, however, used extracts of the whole pituitary body.

Thyroid Gland.—E. v. Cyon⁵ formulates a new theory of the functions of the thyroid, based on the observed effects of iodothyron on the cardiac nervous mechanism. He finds that intravascular injection of iodothyron increases the excitability of the inhibitory mechanism of the heart and of the depressor nerve, and diminishes that of the augmentors; while Barbèra⁶ observed that neutral inorganic salts of iodine (NaI) have the opposite effect, paralyzing the vagus and depressor fibers and increasing the excitability of the augmentors and vasoconstrictors. Cyon looks upon iodothyron (and muscarin) as absolute physiologic antagonists to iodine-salts (and atropin). He supposes that it is the office of the thyroid to transform into iodothyron the iodine-compounds introduced into the body, which would act injuriously by paralyzing the vagus and depressor. He alleges that the vasomotor nerves of the thyroid, and therefore the quantity of blood passing through the gland, can be powerfully influenced by excitation of the cardiac nerves (vagus and depressor). There is, in short, such a mutual relation between the thyroid and the heart that changes in the activity of the heart affect the circulation in the thyroid; while the thyroid, in its turn, through the chemie substances produced in it, affects the action of the heart. The circulatory symptoms that follow removal of the glands he explains as due to the loss of this regulative influence. [While, as E. Harnack⁷ has pointed out, there are certain flaws in the evidence by which Cyon has attempted to demonstrate the antagonism of iodothyron and the iodine-salts, the paper is a very suggestive one. Not the least of its merits is the emphasis laid on the often-forgotten fact that the properties of the physiologic mechanism on which a substance acts when introduced into the organism are quite as influential in determining the result as the mere chemie reactions of the substance.]

Hutchison⁸ states that of the products of artificial digestion of the colloid

¹ Arch. de Physiol., p. 104, 1898.

² Berlin. klin. Woch., June 27, 1898.

³ Jour. Exper. Med., vol. iii., p. 245, 1898.

⁴ Compt. rend. de l'Acad. des Sci., June 28 and Sept. 13, 1897, and Apr. 18, 1898; Pflüger's Arch., Band lxx., S. 262; lxxi., S. 431; and lxxiii., S. 339.

⁵ Pflüger's Arch., Band lxx., S. 126.

⁶ Ibid., Band lxxviii., S. 434.

⁷ Centralbl. f. Physiol., Band xii., July 23, 1898.

⁸ Jour. of Physiol., vol. xxiii., p. 178.

secretion of the thyroid, only those that contain iodine are active. [This follows naturally from the observations of] R. Tambach,¹ who finds that when the iodine-containing proteids of the thyroid are digested with artificial gastric juice the decomposition does not go so far even as the splitting off of the iodothyron. In order that this may be split off, the proteid molecule must be destroyed. According to Hutchison, the artificial addition of iodine to nuclealbumin (from the thymus) does not confer on it any of the physiologic properties of the iodine-containing substances of the thyroid. [This was to be expected, since] an attempt by E. Roos² to increase artificially the amount of iodothyron in the thyroid substance outside of the body completely failed. [It has been shown, however, by Baumann and others that feeding with iodine-containing substances leads to an increase in the amount of iodothyron in the thyroids.]

As to the causation of the symptoms produced by feeding with thyroid extracts (induced thyroidism), R. H. Cunningham³ concludes that they are due to an intoxication produced by decomposed thyroid material, since feeding with fresh thyroids does not give rise to them. The changes in the metabolism of healthy individuals produced by thyroid feeding, including the increased combustion of fat which is so often noted, are to be explained, according to J. A. Andersson and B. Bergmann,⁴ as entirely due to increased muscular activity. Where this is avoided the metabolism is unaltered. That, as a matter of fact, thyroid extracts cause increased capacity for [and therefore increased temptation to] muscular exertion is once more asserted by A. Mossé.⁵ [For **orchidic extract** this seems now to be well established (O. Zoth).⁶]

Kidney.—R. Tigerstedt and P. Bergmann⁷ have made a thorough experimental investigation of the physiologic action of extracts of the kidney. According to them, the kidney contains a substance (renin) which, when injected into the veins of an animal, raises the blood-pressure, essentially through its action on the peripheral vasomotor centers. They suggest that this action may be responsible for secondary hypertrophy of the heart in certain renal diseases, perhaps because the substance is then formed in abnormal amount or excreted with abnormal slowness.

J. Teissier and H. Frenkel⁸ believe, on the strength of observations on patients with uremic troubles and on animals in which uremia had been artificially induced, that appreciable benefit is produced by the injection of extracts of the kidney. [But even if we admit such an action, it would be rash to conclude without more positive testimony that this is at all specific to renal extracts.]

Spleen.—J. Gachet and V. Pachon⁹ reaffirm [what Schiff asserted long ago] that the spleen takes an important part in the elaboration of the proteolytic ferment of the pancreatic juice, and speaks [too positively, we think] of protrypsin as an internal secretion of the spleen. Injected into animals deprived of the spleen, this protrypsin is said to be taken up by the pancreas and changed into trypsin. I. Ott¹⁰ makes the statement that extract of spleen when injected into the blood markedly increases the peristaltic movements of the intestine.

¹ Zeit. f. Biol., Band xxxvi., S. 549, 1898.

² Zeit. f. physiol. Chem., Band xxv., S. 242.

³ Jour. Exper. Med., vol. iii., p. 147, Mar., 1898.

⁴ Scandinavisches Arch. f. Physiol., Band viii., S. 326.

⁵ Arch. de Physiol., p. 732, 1898.

⁶ Pflüger's Archives, Band lxi., S. 386.

⁷ Scandinavisches Arch. f. Physiol., Band viii., S. 223, 1898.

⁸ Arch. de Physiol., p. 108, 1898.

⁹ Ibid., p. 363.

¹⁰ Med. Bull., Oct., 1897.

THE NERVOUS SYSTEM.

Histologic Elements.—St. Apáthy,¹ in an important communication on the conducting elements of the nervous system (in certain invertebrates), clearly demonstrates the existence of fibrils in the axis-cylinder of the nerve-fiber. These fibrils are sharply bounded and run right up to the nerve-cells, where they form either a single basket round the periphery of the cell ("sensory cells"), or one basket round the periphery and another round the nucleus of the cell ("motor cell"). [Since the baskets of neighboring cells may be united, this discovery tends to resuscitate—of course, with modifications—the "general nervous network" of Gerlach.]

Histologic changes (chromatolysis) are again described in the nerve-cells of the cord in experimental tetanus by Couromont, Doyon, and Paviot,² and by C. Parascandolo³ in experimentally produced shock and in extensive superficial burns.⁴ [But, as the first-named authors admit, such a histologic change has nothing specific in it. It is only a general token of derangement in the function of the nerve-cell.]

E. Steinach⁵ reaffirms the existence of motor fibers for the intestine in the posterior spinal roots in the frog, which Horton-Smith had denied; and J. Wana⁶ denies the presence in the same roots of motor nerves for the skeletal muscles, which Horton-Smith had affirmed. [All that seems to remain of the English author's work, thus ground between the upper and the nether millstone of German criticism, is the proof that, as a somewhat rare anomaly, the posterior roots do contain skeletal motor fibers.]

Nervous Paths.—The well-worn question, whether or to what extent the sensory path decussates in the cord, is again discussed by J. Déjerine and A. Thomas⁷ in connection with a case of syphilitic hemiparaplegia with crossed anesthesia. They conclude that in man the majority of the facts seem to favor total or almost total decussation in the cord. [But this conclusion, as they admit, cannot be extended to the higher animals, in some of which, at any rate, (as the dog and monkey), the crossing is certainly incomplete. Nor is it very easily deduced even from the phenomena observed in their own case.] The ascending degeneration was almost confined to the direct cerebellar tract and Gowers's tract on the side of the lesion. The posterior columns were practically normal. The tactile sensibility was only slightly impaired in the unparalyzed leg; the sensibility for pain and temperature was much enfeebled. [These facts confirm the common doctrine that the posterior columns are the path for tactile impressions and the lateral columns for impressions of pain and temperature. The experiments of O. Langendorff,⁸ which seemed to indicate that these impressions are conducted by the gray matter, cannot be accepted; for they were based on the assumption that only the gray matter of the central nervous system, and not the white, is rendered nonconducting by anemia.] H. E. Hering⁹ has shown (as Minkowski did long ago) that the white matter suffers as well as the gray. According to G. Bikeles,¹⁰ too, longitudinally coursing fibers are absent from the gray matter of the cord, and therefore the existence of long longitudinal paths in it is highly doubtful.

Decussation of the Optic Nerves.—[The announcement by v. Kölliker,

¹ Mittheil. a. d. Zool. Stat. Neapel. Band xii., Heft 4, S. 495, 1897; Centralbl. f. Physiol., Band xii., S. 168.

² Arch. de Physiol., p. 472, 1898.

³ Ibid., p. 714.

⁴ Ibid., p. 555.

⁵ Pflüger's Arch., Band lxxi., S. 401.

⁶ Centralbl. f. Physiol., Band xii., S. 313, Aug. 6, 1898.

⁷ Ibid., p. 138.

⁸ Pflüger's Arch., Band lxxi., S. 523.

⁹ Arch. de Physiol., p. 594, 1898.

¹⁰ Ibid., S. 346.

in 1896, that there was no longer any doubt of the complete decussation of the optic nerves in man, which made such an impression at the time, has not commanded universal assent.] H. Hellendall,¹ *c. g.*, and D. Hansemann² show that in 3 cases of complete atrophy of the right optic nerve, due to long-standing disease of the right eye, some of the atrophied fibers do not decussate at the chiasma, although the majority do. And M. Knies³ also supports the old view that, while there are marked individual differences in the course of the optic fibers, there is in all cases only a partial decussation.

Reflex Actions.—Van Gehuchten⁴ lays stress on the importance of the “nervous tone” of the motor cells of the anterior horns in reflex action. This tone is maintained by impulses reaching them from the posterior root-fibers, and also from the cerebral cortex and the cerebellum. He considers that this assumption enables us to explain why reflexes may be exaggerated after lesions of the pyramidal tracts or abolished after a high transverse lesion of the cord amounting to complete section.

J. Rosenthal and M. Mendelssohn⁵ reassert their view that in frogs and mammals the transfer of the afferent impulses concerned in reflex movements to the efferent portion of the arc takes place in the cervical region of the cord, and perhaps in the bulb as well. When the cervical region is destroyed, they say, the former minimal stimuli are no longer effective in producing reflex movements, although with stronger stimuli the afferent impulses seek other paths and reflex movements are discharged.

Brain.—H. E. Hering⁶ has made an exhaustive analysis of the coördinated movements concerned in opening and closing the hand in monkeys. These movements can be produced by stimulation of the cortex or the internal capsule; but not by stimulation of the anterior spinal roots. When the hand is opened the muscles that open it are excited, and those which close it are inhibited from the cortex. He looks upon hemiplegia of central origin in man as essentially an interference with the coördinated movements of the extremities, which are normally under cortical control.

Sherrington⁷ continues his study of the phenomenon named by him “cerebrate rigidity,” a kind of long-sustained extensor spasm seen after removal of the cerebral hemispheres (in the monkey). He finds that the spasm is largely due to centripetal impulses coming from the rigid limb, and can be inhibited by stimulation of various regions of the central nervous system—*c. g.*, the portion of the cortex around the fissure of Rolando.

Regeneration of Sympathetic Fibers.—J. N. Langley⁸ contributes an extremely interesting paper on the union of the cranial autonomic fibers with the nerve-cells of the superior cervical ganglion. He introduces the new term “autonomic nervous system” to include the sympathetic system, the allied nervous system of the cranial and sacral regions, and the local nervous mechanism of the gut. When the central end of the vagus (in the cat) is sutured to the peripheral (cephalic) end of the cervical sympathetic, some of the vagus fibers make functional connection after a time with the cells of the superior cervical ganglion, so that stimulation of the vagus will now cause all the effects formerly produced by stimulation of the sympathetic. Here the vagus fibers evidently change their function; and Langley draws the general conclusion [which seems justified] that there is no fundamental difference between the preganglionic autonomic fibers of the body. Their function depends not so

¹ Arch. f. Physiol., S. 497, 1897.

² Zeit. f. Biol., Band xxxiv., S. 125, 1897.

³ Ibid., S. 21.

⁴ Jour. of Physiol., vol. xxii., p. 319.

⁵ Ibid., S. 513.

⁶ Neurol. Centralbl., Band xvi., S. 919, 1897.

⁷ Pflüger's Arch., Band lxx., S. 559.

⁸ Ibid., p. 215; xxiii., p. 240.

much on their inherent properties as on the nerve-cells with which they become connected in the ganglia.

Trophic Nerves.—[As was indicated in the YEAR-BOOK for 1897, the question of the existence of specific trophic nerves seems definitely settled in the negative.] Further evidence in support of this conclusion is brought forward by A. Hanan,¹ who finds that all the alterations in the cornea (including the microscopic necroses and macroscopic keratitis) after section of the trigeminus are due to external influences acting on the unprotected eye; and by G. Bikeles and A. Jasinski,² who deny that any "trophic" disturbances follow extirpation of the spinal ganglia, as had been asserted by Gaule and others.

Excitability of a Nerve at Different Points.—[Whether the intensity of a nerve-impulse undergoes any change as it passes along a nerve is now an old problem. Bound up with its solution is the answer to the question whether the excitability of a nerve is the same at all points.] For uninjured nerve this latter question seems to be decided in the affirmative (A. Beck,³ and I. Munk and P. Schultz⁴).

SPECIAL SENSES.

Vision—Accommodation.—Th. Beer⁵ has extended his comparative observations on accommodation to reptiles. He concludes that both in reptiles and in birds the fundamental idea of Helmholtz's theory [that the tension of the suspensory arrangements of the lens is diminished in accommodation] holds good. [The theory of Helmholtz, indeed, in spite of the assaults made on it by Tscherning, Schön, and others, appears to be taking on a new lease of life.] And the observation of C. Hess and L. Heine,⁶ who find that during accommodation in birds and mammals (including monkeys) there is no change in the intraocular pressure, is also more easily reconciled with Helmholtz's theory than with its modern rivals. Neither mydriatics nor myotics directly affect the intraocular pressure.

The statement of Beer⁷ that in all the reptiles investigated by him the eye was emmetropic or only slightly hypermetropic is contradicted by G. Abelsdorff,⁸ who saw, on the contrary, considerable hypermetropia in the alligator.

Visibility of the Röntgen Rays.—E. Dorn⁹ believes he has proved that these rays are visible, and Röntgen himself confirms this statement. [It is, however, by no means unanimously accepted. The experimental difficulties are great and the sources of error many. Some of these are acutely discussed by Cowl and Lævy-Dorn.¹⁰]

Color-blindness.—[König and von Kries have attempted to explain total color-blindness on the assumption that the cones in such cases are either entirely insensitive or are replaced by rods.] C. Hess and E. Hering,¹¹ however, by a careful investigation of 3 cases of total color-blindness, have convinced themselves that this theory is erroneous.

Function of the Semicircular Canals.—[In spite of the enormous amount of work which has been devoted to the elucidation of the function of the semicircular canals, the most diverse views continue to be held.] E. von

¹ Zeit. f. Biol., Band xxxiv., S. 146, 1897.

² Centralbl. f. Physiol., Band xii., S. 345.

³ Arch. f. Physiol., S. 414, 1897.

⁴ Ibid., S. 297 and 415, 1898.

⁵ Pflüger's Arch., Band lxxix., S. 507.

⁶ Centralbl. f. Physiol., Band xii., S. 417, Aug. 16, 1897.

⁷ Loc. cit.

⁸ Arch. f. Physiol., S. 155, 1898.

⁹ Verhandl. d. Berlin. physiol. Gesellsch.; Arch. f. Physiol., S. 544, 1897.

¹⁰ Ibid., S. 548.

¹¹ Pflüger's Arch., Band xxi., S. 105.

Cyon¹ again discusses the subject in a lengthy paper [a great part of which, according to the fashion of this author, is devoted to destructive criticism]. He denies that the canals have any special relation to equilibration, and attempts to rehabilitate his well-known theory that they are the peripheral organs of the spatial sense. With the help of the sensations set up by excitation of the nerve-endings in the ampullæ the idea of a three-dimensional space is supposed to be formed, and to this all the rest of our sensory impressions, in so far as they involve the localization of objects, are referred.

Egger,² on the basis of pathologic observations, attributes to the canals, in addition to their function of appreciating movements of the head, the power of informing us as to the direction of sounds.

ELECTROPHYSIOLOGY.

[It is impossible to do more than mention, within the limits allowed us, one or two of the large number of important papers which have appeared in this branch of physiology since our last report.] Waymouth Reid and J. Macdonald³ have demonstrated and even obtained records of the action-current of the phrenic nerves during natural respiration. M. Lewandowsky⁴ has observed a negative variation in the vagus during inflation of the lungs; and J. Bernstein⁵ a reflex negative variation produced by artificial stimulation of sensory nerves (negative variation in the anterior spinal root when the corresponding posterior root was stimulated). F. Gotch and G. J. Burch⁶ have succeeded in obtaining with the capillary electrometer records of the electrical response of a nerve to a single excitation. J. Loeb⁷ has contributed several most suggestive papers on the physiologic action of ions.

¹ Arch. f. Physiol., S. 29, 1897.

² Arch. de Physiol., p. 774, 1898.

³ Jour. of Physiol., vol. xxiii., p. 100, 1898.

⁴ Pflüger's Arch., Band lxxiii., S. 288.

⁵ Ibid., S. 374.

⁶ Proc. Physiol. Soc.; Jour. of Physiol., vol. xxii., p. 32.

⁷ Pflüger's Arch., Band lxxix., S. 1; lxxi., S. 457.

LEGAL MEDICINE.

By WYATT JOHNSTON, M. D.,
OF MONTREAL, CANADA.

Epitome.—Although there has been no exceptional advance in any one branch of legal medicine, the fact that the literature of the year includes more than 800 articles and monographs, in addition to the numerous judicial decisions, indicates no want of activity in this department of medical science. The recent publication by Abba of a simple biologic test for arsenic, based upon Gosio's discovery that certain fungi liberate hydrogen arsenid, is one of the most promising of the new tests recorded. As usual, nearly one-half of our indigenous medical literature is occupied in discussing the shortcomings of the expert medical witness, whose many defects evidently do not arise from the want of a clear perception of "the mote in thy brother's eye." We have included in this year's retrospect the literature on traumatic disease which, under the name of *Unfallheilkunde* (for which as yet we have no exact equivalent), has made such rapid advances in Germany during the past few years. The tendency to socialistic legislation affecting the liability of employers is so marked in this country and in England that the study of the subject is becoming imperative, as we have elsewhere¹ pointed out. This subject was, at the 1898 Congress of German Naturalists and Physicians, combined with the section of legal medicine, a union which seems to have been fruitful of more good work than the customary one with psychology. Of several important works which have appeared during the year on the subject, we would specially mention the *Handbuch der Unfallerkkrankungen*, by C. Theim (Stuttgart, 1898), which can be compared only with the standard work of C. Kauffmann (2d ed., Stuttgart, 1897). It differs essentially from the latter, however, in that the questions are studied from the standpoint of scientific medicine rather than that of practical medicolegal work and precedent. The work of Pearce Bailey, *Accident and Injury in Relation to Diseases of the Nervous System* (New York, 1898), although it contains only a small number of personal observations, discusses very fully the questions involved and shows that the problems have been carefully thought out by the author. One of the most difficult problems in connection with accident-diseases is the determination whether certain pathologic effects are to be regarded as due to accident or as injurious effects of occupation, a matter of considerable importance in fixing the responsibility. The important work by Th. Sommerfeld, *Handbuch der Gewerbekrankheiten* (Berlin, 1898), gives valuable information on this subject. In general legal medicine the American translation of E. Hoffmann's *Atlas of Legal Medicine* (Phila., Saunders, 1898), and the *Lehrbuch der Gerichtlichen Medizin* of P. Dittrich, are important. A new *Stereoscopic Atlas of Legal Medicine*, edited by A. Lesser, is being published (Berlin, Barth, 1898). R. von Jaksch has issued a large monograph on

¹ Phila. Med. Jour., Aug. 13, 1898.

poisons, *Die Vergiftungen*, Vienna, 1898, in which the symptomatology is treated with special completeness. E. Laurent has given in *Arch. d'Anthrop. crim.*, Jan., 1898, a very full *résumé* of the medicolegal French theses of 1897.

Criminology.—A new periodical, the *Arch. f. Kriminologie u. Kriminalstatistik*, commenced publication during the year, and will apparently fill a position similar to that of the *Arch. d'Anthrop. crim.*, and deal largely with sociologic questions. E. Tarnowsky¹ has published statistics of **criminality in Russia** for the period 1874-94, showing a slight relative decrease in the frequency of violent crimes per unit of population. A. Berard² gives a succinct account of the French criminal statistics for 1895, showing no increase in homicidal and violent crimes. The homicide-rate per 100,000 is given as follows: France, 1.30; England, 0.48; Germany, 0.85; Belgium, 2.41; Spain, 4.17; Italy, 6.45; Eastern United States, 6; Western United States, 28. B. Pailhas³ calls attention to the fact that a rapid pulse in a person apparently outwardly calm may be an important evidence of concealed emotion.

MEDICAL JURISPRUDENCE AND MEDICAL RESPONSIBILITY.

A. Fuld⁴ holds that **neglect of asepsis** should be regarded as malpractice, since asepsis is now a well-recognized principle of medical science. As an error of omission it is more excusable than one of commission, and is less in degree where danger of infection was not *a priori* to be expected.

Responsibility for operations on the insane was recently discussed before the French Society of Legal Medicine, Briand⁵ and Pique⁶ holding that patients mentally unfit to decide for themselves should be regarded as children and the consent of their relatives or guardians obtained before operations. When, however, the case was one of emergency the surgeon should act on his own responsibility. Grandjux⁷ stated in connection with the responsibility in the case of **operations on soldiers**, that while theoretically the soldier was not left a free choice, yet practically apart from emergencies and the trifling operation of vaccination the French soldier had as much freedom in the matter as a private citizen.

Responsibility for the Communication of Syphilis by Nurses.—Constant,⁸ discussing the matter from a legal standpoint, considers the nurse entitled to damages if the child can be proved to be the sole cause. The child's relatives or an employment-bureau through which the nurse was engaged may each be held responsible if the child's condition was known to them and they failed to warn the nurse. Decisions of the Paris courts⁹ found damages against the mother because she knew that the child was sickly and covered with spots. In another case in which the child was healthy-looking when sent away no costs were allowed. Another case was dismissed¹⁰ because an examination by experts had failed to show syphilis in the parents and the child looked healthy. In another case¹¹ it was decided that the author of the accident must commit a fault to be responsible. Dubois¹² does not think that transmission of syphilis by a nursing necessarily raises a presumption of fault on the part of the parents. The existence of the disease he regards as a common misfortune, and unless the danger can be shown to have been foreseen and

¹ *Arch. d'Anthrop. crim.*, Sept., 1898.

² *Ibid.*, May, 1898.

³ *Ann. d'Hyg. pub.*, July, 1898.

⁴ *Ann. d'Hyg. pub.*, July, 1898.

⁵ July 17, 1884, and Feb. 24, 1893.

⁶ Bayonne, June 22, 1897.

⁷ *Ibid.*, Jan., 1898.

⁸ *Zeit. f. prakt. Aerzte*, Heft 13, 1898.

⁹ *Soc. de Méd. lég.*, Nov. 12, 1898.

¹⁰ *Ibid.*, Feb., 1898.

¹¹ Paris, Nov. 27, 1898.

¹² *Ann. d'Hyg. pub.*, May, 1898.

wilfully ignored he would not hold either parent responsible. Fournier¹ thus classifies the points to be decided: 1. Is the nurse affected with syphilis? 2. Is the child affected? 3. Has the nurse contracted the disease from the child? 4. Did the parents know that the child had hereditary or acquired syphilis? The existence of a chancre upon the nurse's breast and also its absence from her genitals must be established. Its condition as to cicatrization is also useful in establishing the date of infection. If the chancre appeared on the breast within 2 weeks of the date of receiving the child, it must have come from a previous infection. The possibility of extragenital infection from adults or from another infant must be borne in mind. Fournier lays special stress upon the examination of the nurse's own child, which Tardieu has called "the touch-stone" of the mother's health. It is not necessary to show how syphilis arose in the family. The parents may show no signs of syphilis and the child have appeared healthy when sent away, owing to the frequency of a late appearance of the disease. If the parents were unaware that the child was syphilitic they erred through ignorance only. The civil responsibility of the husband was not removed if the wife had acquired syphilis from a lover. P. Brouardel² recommends strongly the practice of waiting at least 48 hours after preparing a **medicolegal report** before filing it, so as to give opportunity for revision and abridgment. [We have found it convenient in practice to file two separate reports: a formal one as short as possible, rarely requiring a full foolscap page, and a supplementary report which is a full and exact copy of all the notes taken. This latter report, if submitted to the experts for the defence, enables them to understand the exact state of the scientific side of the case, and usually they find themselves obliged to agree with the main conclusions. This has the effect of reducing cross-examination to a minimum. Retouching is objectionable, and abbreviating the technical parts of the report usually has the effect of puzzling the experts and giving excuse for long cross-examination without making the report intelligible to nonmedical persons.]

DEATH, AND CONDITIONS AFFECTING DEAD BODIES.

The number of sudden deaths recorded in connection with **enlargement of the thymus gland** increases each year. An important light is thrown on the subject by Ohlmacher,³ who found that in 18 cases of epilepsy a large and apparently functionally active thymus gland existed, and there was hyperplasia of the lymph-glands throughout the body and of the lymph-follicles on the mucous surfaces. In view of the convulsive and paroxysmal nature of the symptoms attending sudden death in young children, the recognition of them as a fairly constant condition in epileptics is of much interest. A case of sudden death in a female infant of 6 weeks is reported by Seydel.⁴ The thymus was hard and almost gristly, measuring 6 by 5 by 2 cm., and covering the upper third of the heart. The interior of the gland showed some grayish juice. Helm⁵ reports a case in a child of 2 years. The gland was enlarged and contained old abscesses, nothing else being found to explain the death. O. Clessin⁶ reports a death in a child, 2 months old, free from rickets. The thymus covered two-thirds of the heart and measured 7.5 by 5.5 by 2 cm., weighing 31 gm. The nose and trachea contained frothy blood. In none of the cases was mechanical compression clearly shown. C. H. Hunter⁷ reports **2 cases of**

¹ Bull. m d., Dec. 5, 1897.

² Phila. Med. Jour., Jan. 1, 1898; Jour. Am. Med. Assoc., July 2, 1898.

³ Viertelj. ger. Med., Oct., 1898.

⁴ M nch. med. Woch., Heft 11, 1898.

⁵ Ann. d'Hyg. pub., Jan., 1898.

⁶ Deutsch. med. Woch., May 12, 1898.

⁷ Brit. Med. Jour., Apr. 2, 1898.

primary fatal laryngeal stenosis occurring in the same family in children aged 19 and 7 months; the cases occurred within a few days of one another; both were rachitic. [Sudden deaths in children occur so often without any lesions that too much importance must not be attached to them when found.]

Significance of Subpleural Ecchymoses.—F. Strassman¹ is not inclined to regard the existence of ecchymoses as indicating that death is primarily due to asphyxia as contrasted with heart-failure. They show the *mode* of death rather than the cause, and indicate merely that circulation has continued after stoppage of respiration. Subpleural ecchymoses have less significance than those in other organs. In children the inner organs tend more than the skin to show ecchymosis; in adults the reverse is the case. Haberdas² finds that ecchymoses are not a reliable indication of asphyxia, especially in children, and points out their tendency to **postmortem ecchymosis**. This he could uniformly produce by hanging the bodies in an inverted position. The position of the body is an important factor in estimating the significance of ecchymoses. [The legal mind is slow in grasping modern ideas about ecchymosis.]

Fat-emboli of the Lungs.—Carrara,³ working under von Hofmann, found that of 102 cases examined, more or less fat-embolism was present in 28. Of 27 cases of diseases of the lungs and kidneys, it was found in 22%; of 13 cases of burns and scalds, in 44%; and of 17 cases of fractures, in 76%. It was found in only 1 case of phosphorus-poisoning out of 5 examined. E. Payr⁴ reports a case of fatal fat-embolism following the forcible extension of an ankylosed knee-joint, and suggests that some supposed fatal results of anesthetics may be explained in this way. Death occurred in 24 hours. Bégouin⁵ advises aspiration of the heart in **air-embolism** in view of the very favorable results obtained by him in experiments upon animals.

Dangers of Artificial Respiration.—Max Busch⁶ has shown experimentally, by going through the motions prescribed for artificial respiration, that food may readily be pressed out from the stomach and enter the air-passages of cadavers. He thinks that epigastric pressure should be avoided unless a stomach-tube has first been passed. [We recently saw a case in which attempts at resuscitation begun after death produced a condition of this sort, which would have proved very puzzling had not the circumstances been known, as there happened to be a condition of edema of the glottis present.] T. Oliver and R. Bolan,⁷ from the result of a number of experiments on animals, conclude that the mode of death in **electric shock** is asphyxia rather than heart-failure.

Aspiration-pneumonia from Inhalation of Fluids.—F. C. Stubenrath⁸ has made an extensive series of autopsies and experiments upon men and animals after inhalation of water and other fluids during the act of drowning. Upon resuscitation more or less bronchopneumonia could always be made out, its severity depending partly upon the character of the liquid inhaled and on the amount of hemorrhage into the alveoli during the struggle for breath. In the case of clean water the pneumonia was usually slight; while in that of sewage, feces, etc., it was liable to go on to suppuration or local gangrene. The discovery of an aspiration-pneumonia postmortem may afford evidence as to the existence of some antecedent condition favorable to its development, such as narcotic poisoning, etc.

¹ Viertelj. ger. Med., Apr., 1898.

² Friedreich's Blätter, July, 1898.

³ Soc. de Biol., Jan. 22, 1898.

⁴ Brit. Med. Jour., Jan. 15, 1898.

⁵ Ibid.

⁶ Münch. med. Woch., July 12, 1898.

⁷ Arch. d'Anthrop. crim., Sept., 1898.

⁸ Thesis, Würzburg, 1898.

Karcher¹ found **fragmentation of the heart-muscle in sudden deaths**, chloroform-narcosis, fracture of the skull with fat-embolism, acute infections, valvular heart-lesions, pericardial adhesions, tuberculosis, and pernicious anemia. He classifies the conditions under which it is found in prolonged illness, prolonged agony, and sudden death. The condition could be produced experimentally by division of the cord and administration of chloral. Macroscopically the heart-muscle is soft and shows pale areas of degeneration [?].

F. H. Cook² reports a case of **death from a wasp-sting** in the back of the throat. Death ensued in 25 minutes [probably from edema of the glottis].

Effect of Contractures on Rigor Mortis.—E. Martin³ relates 4 cases studied with A. Lacassagne, in which spastic contractures of one foot or one hand were noticed postmortem on external examination, and a lesion of the opposite side of the brain predicted on that account, and afterward found. He considers that this condition may afford valuable information on external examination of bodies. He explains it by assuming that the spasm occurs at the moment of death from irritation of the corresponding nerve-centers by a focal lesion, and that a contracture is thus induced which keeps the part in a state of cadaveric spasm until it is fixed in position by rigor mortis. Mazellier⁴ brings some recent personal observations and experiments to show that cadaveric spasm originates in the last vital act.

F. Mayer⁵ has published an important monograph on the **changes in the posture of dead bodies** exposed to great heat. The characteristic flexions of the elbows and knees, with closure of the fingers and extension of the ankles (*attitude de combat* of Devergie), were interpreted at first as being due to contraction before death through pain or other vital causes. Recently it has been regarded as an effect of heat; but the mechanism of its production has remained in doubt, some assuming that it was due to the coagulation and consequent shortening of the muscle from heat; others (including Brouardel) that it was due to the effect of heat in contracting the skin and superficial fasciæ. The matter has been much speculated upon without any conclusive experimental work being done. Mayer, by experimenting with narcotized or recently killed animals, and with amputated limbs and human bodies shortly after death, before the onset of rigidity, has shown conclusively that contraction of the muscles through heat is the essential cause of the altered positions of the limbs. [The petrified bodies at Pompeii show typical heat-postures.]

F. Reuter⁶ has studied the **histologic changes in the genitals from the effect of high temperature**. From an almost completely charred mass he was able microscopically to demonstrate uterine tissue by the finding of smooth muscle-fiber and typical glands. The organ had to be first macerated for 24 hours in running water and sections cut and stained. Nuclear staining was good. Appearances of congestion and hemorrhage of the mucosa had no significance, as they could be induced artificially by heating the uterus after death, and were due to the blood being driven into the interior by the effect of heat. Experimentally congestion and serous blisters on the surface of the penis could be produced by heat applied to the root of the organ. In charred testes the tunics and the tubules could be distinctly made out microscopically. A peculiar effect of the heat was to alter the connective tissues, so

¹ Deutsch. Arch. f. klin. Med., Band lx.

² Arch. d'Anthrop. crim., Sept., 1898.

³ Ueber d. Einfluss hoher Hitze a. d. Stellung von Leichens, Braummüller, Vienna, 1898.

⁴ Viertelj. ger. Med., July, 1898.

⁵ Brit. Med. Jour., Nov. 5, 1898.

⁶ Thèse de Lyons, 1898.

that when macerated they showed distinct striation. Muscle could be distinguished by its yellow tint and the fact that the striation was visible without maceration.

L. J. Mitchell¹ reports cases of **adipocere-formation**, in one of which the body had been enclosed in a zinc-lined box for over 3 years. The odor was offensive and highly ammoniacal.

J. R. Ewald² has observed that the **cadaveric opacity of the crystalline lens** can, in the case of man and animals, be made to disappear by local pressure by shocks to the head. Its absence might therefore indicate that the body had been disturbed.

Fauna of Dead Bodies.—Mégnin³ reports 3 additional cases in which the confessions of suspected persons verified the statements made by him as to the date of death. The determinations were made according to the methods laid down in his previous publications. Dutrait and Lacassagne⁴ report the finding of *Silpha sinuata* upon the remains of a dead body considered not to have been more than 2 months dead. [This is 2 months earlier than the minimum time allowed by Mégnin. More extended observations under known conditions are much needed on this point.]

WOUNDS AND INJURIES.

G. Puppe⁵ discusses the differential diagnosis between **injuries of the skull from blows and from falls**. Multiplicity of skin-wounds indicates probability of a blow. The term "formed fractures" is suggested for those having appearances suggesting the instrument which caused them. Fissures may be highly characteristic when affecting the outer table only. Hairs found in the wounds may exhibit characteristic changes at the point of separation; if bent or hooked they indicate an angular instrument. Similar changes in the shaft of the hair make it probable that it lay over an already exposed bone, signifying a repetition of violence. Peculiar oval bruising of the hair-shaft may be due to the hair being compressed between two rounded surfaces. Experiments with hairs from the head of the injured person are advised. E. Müller⁶ has written an important article on the same subject.

A. J. Bouffler⁷ recommends the use of the term **cerebral contusion** to denote certain injuries of the brain. There is too great a tendency to classify brain-lesions either as concussion or compression, and it is suggested that the latter term be confined to cases in which there is no gross lesion whatever. [The term brain-contusion is already in use in Germany.]

N. W. Sharp⁸ attributes the following peculiarities to **electrical burns**: When seen early they look dry, crisp, and bloodless, and are excavated. Within 36 hours serous oozing and hyperemia occur, pain is moderate, and the systemic shock from the contact considerable. [We have been struck with the frequency with which only trifling burns, scarcely noticeable, occur in fatal electric shock, and with the constant fluidity of the blood, both before and after removal from the body.]

M. Carrari⁹ has investigated, with confirmatory results, the statement of Gosselin that the mechanism of production of **contusions of the lung** with intact chest-wall is through reflex closure of the glottis fixing the organ.

¹ Boston M. and S. Jour., Nov. 10, 1898.

² Bull. de l'Acad. de Méd., Mar. 22, 1898.

³ Viertelj. ger. Med., Apr., 1898.

⁷ Phila. Med. Jour., Oct. 29, 1898.

² Ibid., Oct., 1898.

⁴ Arch. d'Anthrop. crim., July, 1898.

⁶ Friedrich's Blätter, Nov., 1898.

⁸ Ibid., Jan. 29, 1898.

⁹ Rivista di Med. Leg., No. 4, 1898.

Experiments on deeply narcotized and tracheotomized animals gave negative results; whereas contusions could be readily produced in the case of control-animals.

Gunshot-wounds.—The improvement in modern firearms has been so rapid and the changes so numerous that much that was thought to be axiomatic in our knowledge of the subject will require revision. The modern military arm of small caliber and high velocity was found recently to be wanting in destructive power, though capable of remarkable penetrating force. This has since been rectified by modifying the bullet and softening the conical tip. This type of missile, to which the term **Dumdum** has been given, has the peculiarity of spreading itself on entering the soft tissues, and, without precisely producing a true explosive effect, tears a large hole through the flesh and shatters any bone it meets. The extensive lacerations so produced have led to expressions of opinion by J. B. Hamilton,¹ von Bruns,² and others that the weapon was too barbarous and the injuries inflicted too inhuman to be tolerated in civilized warfare. On the other hand, W. F. Stevenson³ states that the wounds of bones do not differ from those by the old Martini, though the soft parts are more lacerated. Seelhorst⁴ reports 2 cases of small-caliber rifle-wounds of the thigh, the diameter of the exit-wound being 4 cm. C. E. Woodruff⁵ deals very fully with the explosive effects of the modern weapon.

E. Tavel⁶ has found that **infected bullets** are sure to cause severe supuration in experiments upon animals, and the treatment of them antiseptically was unsatisfactory. The excellent aseptic results both in the Greco-Turkish and the Spano-American wars are a lesson that in medicolegal matters we must not take a too purely mechanical view of the injuries inflicted by firearms.

P. Seliger⁷ has written a most exhaustive monographic article on the contusion-effects of wound of the abdomen. (See also YEAR-BOOK for 1897.)

G. Stoker⁸ reports that he was able to distinguish between **healing and nonhealing wounds** by their reaction to litmus. While healthy granulating surfaces gave an alkaline reaction, sloughing and necrotic tissues were found to be acid.

A unique form of injury is recorded by Monlahue,⁹ who saw a case in which alarming symptoms of tympanites were noticed in a man who had been lying in a deep drunken slumber. This was relieved by the passage of a tube, and the wife admitted that from motives of revenge she had inflated the rectum forcibly by means of a pump.

Intestinal Rupture from Contusions of the Abdomen.—A. Schmidt¹⁰ records 8 cases of perforations produced in this manner. The opening is usually rounded. It may arise in 3 ways: (1) From compression against the vertebrae; (2) from unequal tension of the gaseous contents in compression; and (3) from necrosis of the intestinal wall following contusion.

TRAUMATIC DISEASES AND EFFECTS OF ACCIDENT (UNFALLHEILKUNDE).

R. Stern, in Lubarsch and Ostertag's *Ergebnisse d. allg. Path.* for 1897, has given an admirable summary of the most important articles during the

¹ Brit. Med. Jour., May 14, 1898.

² Brit. Med. Jour., May 21, 1898.

³ N. Y. Med. Jour., Apr. 30, 1898.

⁴ Friedreich's Blätter, July, 1898.

⁵ Progrès méd., abstracted in Arch. d'Anthrop. crim., July, 1898.

⁶ Münch. med. Woch., July 12, 1898.

⁷ Proc. German Surgical Congress, 1898.

⁸ Monats. f. Unfallheilk., No. 7, 1898.

⁹ Gaz. hebdom. de Méd., Apr. 28, 1898.

¹⁰ Brit. Med. Jour., Mar. 19, 1898.

past 3 years, reprinted under the title *Trauma als Krankheitsursache*. The subjects treated of are chiefly those which are at present still in the controversial stage, especially trauma and tumors, trauma and tuberculosis, heart-disease, nervous diseases, and pneumonia. An excellent *résumé* of the subject from its practical side is given by G. Ledderhose.¹

Medicolegal Questions in Personal-injury Cases.—C. A. Lightner² has outlined in an interesting manner the chief sources of dispute and points of general interest, giving numerous illustrative cases.

Floquet³ discusses the **extent to which the author of an accident is involved in its indirect medicolegal consequences**, instancing: 1. A diabetic struck by a bicyclist developed gangrene in a wound resulting from the fall; amputation was followed by fatal results. 2. A workman broke his leg, and in consequence of decubitus died of pneumonia. 3. The victim of an accident caused by another developed an infirmity in consequence of inefficient treatment. Floquet thinks responsibility should be limited to the direct consequences. Opinions were divided in the discussion which followed.

Accident-insurance and Operative Treatment.—Wolffberg⁴ objects to a recent judicial decision in Germany that a man can be forced to consent to an operation under penalty of losing his annuity, provided that such operation is the only means of restoring health and is not in itself dangerous.

I. Leval⁵ has found that **dressing accidental wounds with carbolic acid** is an objectionable practice, and is liable to induce local gangrene when resorted to as a "first-aid" measure by unskilled persons. In any strength in which it can be safely employed carbolic acid is not germicidal. Much better results were obtained by the author after abandoning its use.

A. Strümpell⁶ reports a case of **simulation of hematemesis and hematuria** after injury by a 35-year-old man, who claimed to have vomited blood "frequently" after striking his stomach against a cask, and to have passed no water. On being asked to make water, within a few minutes he produced a sample of distinctly bloody urine, which contained squamous epithelium, leptothrix, and traces of muscle-fiber, the blood evidently having come from the mouth. A report was sent that the case must be studied in hospital, where it was established that the urine was free from blood. The man upon being taxed with the deception afterward admitted it.

J. Hahn⁷ describes some simple and ingenious apparatus for estimating quantitatively the force exerted in bending the arm or closing the fist. For the former a pulley is rigged and the rope attached to a spring-balance; for the latter a rubber ball filled with quicksilver is connected by a rubber tube to an upright glass tube, on which a scale is placed to show the height to which the mercury can be propelled. The bulb should be held in a trough, so as not to lose the mercury in case of its bursting.

Trauma and Tuberculosis.—R. Stern,⁸ in criticizing the case-reports on the occurrence of **traumatic phthisis**, states that only 2 cases are recorded which have the clinical proof completed by an examination of the lung made immediately after the injury to exclude existing tuberculosis. Plenty of cases are recorded in which persons in apparent perfect health become phthisical shortly after injury to the chest. It should be borne in

¹ Untersuch. u. Beurtheilung d. Unfallsfolgen, Wiesbaden, Bergmann, 1898.

² Med.-Leg. Jour., July, 1898.

³ Soc. de Méd. lég. de France, Feb. 14, 1898.

⁴ Woch. f. Therap., Heft 7, 1898.

⁵ Arch. f. Unfallheilk., Band ii., 1898.

⁶ Monats. Unfallheilk., Band xxxvi., Heft 4, 1898.

⁷ Ibid., Jan., 1898.

⁸ Ibid., Sept., 1898.

mind that, in order to demonstrate that traumatic phthisis occurs in the same sense that traumatic pneumonia does, we need the proof of an autopsy showing a tuberculous lesion beginning at the seat of a contusion in the lung and all old tuberculous foci absolutely excluded.

Urban¹ points out that because external infection is rare in large wounds and common in slight scratches, it does not follow that a severe injury is necessary for tuberculous infection. A contusion may excite latent tuberculosiis or may form a spot of lessened resistance where bacilli may find an opportunity for invasion, if present in the general circulation.

Willmans² reports the case of a man who received a severe blow on the abdomen with a crowbar and died after 3 weeks' illness. At the autopsy 2 caseous lymph-glands the size of eggs were found at the seat of injury, near the umbilicus. The spleen was swollen and contained miliary tubercles. In the enlarged glands were typical giant cells. No old foci found elsewhere.

A. Lemgen³ found out of 238 cases of local tuberculosis 23 with a traumatic history. In 8 phthisis of the lungs coexisted, having been recognized prior to the injury in only 1 case. G. Coester,⁴ out of 52 cases of tuberculosis of the wrist-joint, found 11 with a distinct traumatic history. G. Wiener⁵ analyzed the statistics of tuberculosis of bones and joints in 436 cases, and found a doubtful history of trauma in 25% and a clear history in 8%.

R. E. Lord⁶ reports a case of fractured ribs followed by fatal caseous pneumonia. The chest was struck against the edge of a desk; bright frothy blood was expectorated the same day, and consolidation began at a point corresponding with the site of the injury.

T. Harris⁷ reports a case of pneumonia and tuberculosis of the lung in a man of 68, following contusion of the chest by a wagon-pole. The autopsy, 3 months later, showed that an old healed cavity had existed opposite the spot injured.

J. Spelten⁸ has analyzed 56 cases of traumatic tuberculosis in which the disease developed at the seat of the injury, and who all were previously healthy. In addition, there were 6 cases in which a latent tuberculous condition became rapidly worse after an injury. No cases were included in which serious doubts existed that there was a connection between the disease and the injury.

O. Schröder⁹ reports a case of traumatic lung-tuberculosis. A laborer of 28, previously healthy and with good family history, fell backward, striking his head, and lay unconscious several hours. After 2 days he was admitted to the hospital, with slight dulness over the right, middle, and lower lobes, moderate fever, and signs of acute bronchitis. After 2 weeks, with evening-rises of temperature, tubercle-bacilli were found in the sputum. Two months later the case began to improve, and gradually recovered completely.

Braunck¹⁰ reports a case of brain-tubercle after trauma. A man of 33 was struck by a stone above the left ear, making a scalp-cut 3 cm. long. One month later he had pains in the head, signs of dry pleurisy, and fever; death in 7 months, with signs of general tuberculosis. Autopsy showed a walnut-sized solid tumor-mass in the left temporal region, which on examination proved to be a typical solitary tubercle.

¹ Münch. med. Woch., Heft 15, 1898.

² Thesis, Bonn, 1898.

³ Thesis, Breslau, 1897.

⁴ Ibid., Apr. 16, 1898.

⁵ Berlin. klin. Woch., Heft 4, 1897.

⁶ Monats. f. Unfallheilk., Aug., 1898.

⁷ Thesis, Marburg, 1897.

⁸ Lancet, May 7, 1898.

⁹ Inaug. Diss., Bonn, 1898.

¹⁰ Monats. f. Unfallheilk., Apr., 1898.

Trauma and Tumors.—Ribbert¹ discusses the question how far can tumors be ascribed to traumatism, and considers that the number of clearly proved cases is very limited where the trauma was distinctly enough localized at the site of the tumor. He thinks that tumors are most likely to develop from the result of a single injury where persistent embryonic rudiments exist, instancing specially the testes. Birch-Hirschfeld² points out that tumors of embryonic rudiments may arise from a single injury, whereas those of developed tissue require repeated injuries or a continued after-effect to explain their occurrence. [We think a study of this matter must convince anyone that a most striking coincidence, to say the least, exists between tumors and injury.]

Adler³ has made a critical study of the **occurrence of brain-tumors after injury**, based on the analysis of 1086 cases, of which 96, or 8.8%, were traumatic, as hydatid cysts, tubercle, and gummata are included in the collected material and form 20% of it; while only a few of the traumatic cases were of this nature, the proportion of traumatic cases to genuine tumor is really higher. Sarcoma was the commonest, next glioma, and third gliosarcoma. A tabular analysis of the traumatic cases is appended.

W. B. Coley⁴ reports 46 cases of **sarcoma** out of 170, or 27%, which gave a history of injury, of which 21 occurred in connection with bone or cartilage. The type of growth was the round-cell form in 29 cases. The injury was a blow in 14 cases, a fall in 12, a contusion in 4, a scratch in 3, a fracture in 2, a laceration in 2, a sprain in 2, a burn in 1, a shot-wound in 1, doubtful in 3. As to time, 24 cases developed in the first 2 months and 10 cases after a year.

H. Fischer⁵ reports the case of a mason, 37 years old, who fell 6 feet upon his head. No external injury except contusion. After short unconsciousness he was able to resume work. Three days later spasms and paresis with headache developed. Six months later he had attacks of Jacksonian epilepsy, left-sided paralysis, and sensory aphasia, and died 14 months after injury. Autopsy showed a gliosarcoma-mass the size of the fist in the right temporal, at a point corresponding to the site of the original contusion.

Trauma and Diseases of the Nervous System.—Morton Prince⁶ has made extensive inquiries to learn if any cases of **traumatic neuroses** were known among football-players, and was not able to learn of any. He also finds that in railway-accidents the occurrence of neuroses is as rare among employés as it is common in passengers. He thinks that these facts indicate that a psychic state of unpreparedness at the time of the accident is one of the main factors.

T. Diller⁷ reports 10 cases of various traumatic nervous affections. He concludes that the nervous affections following severe accidents are, though exaggerated, usually very real; simulation is rare and easily detected; few persons can successfully simulate nervous affections. The symptoms are usually subjective and of the hysterical or neurasthenic type. Sometimes there is progressive degeneration of the nervous tissue. The prognosis is usually serious. The conditions do not form a pathologic nervous entity.

G. Flatau⁸ reports a case of traumatic neurosis in which no claim for damage was made. [Cases of this kind, while of the greatest interest, are, unfortunately, extremely rare.]

¹ Aertzl. Sachverst. Zeitung., Heft 19, 1898.

² Arch. f. Unfallheilk., Band ii., S. 189.

³ Deutsch. med. Woch., No. 22, 1898.

⁴ Am. Jour. Med. Sci., Sept., 1898.

⁵ Leipsig. med. Gesellsch. June 8, 1898.

⁶ Ann. of Surg., Mar., 1898.

⁷ Boston M. and S. Jour., Apr. 28, 1898.

⁸ Zeit. f. prakt. Aerzte, Heft 8, 1898.

F. Frank¹ reports a case of **acute poliomyelitis** in a man of 45, developing within 2 months after a fall upon the back. Firgan² reports several cases in which **muscular atrophy** of the upper extremity followed peripheral injury or infection, being due apparently to an ascending neuritis.

Kirelgässer³ reports that 6 rabbits subjected to spinal concussion by Schumauer's method showed epileptiform seizures at the time of the experiment, and 4 subsequently showed descending degeneration in Goll's and Gowers's columns without ascending degeneration.

Nina-Rodriguez⁴ reports a case in which death occurred 28 years after a stab-wound of the lumbar vertebral column caused by a file, and leading to transverse myelitis and complete paraplegia. The point of the file was found embedded in the bone.

L. Goldberg⁵ reports a case of **traumatic amyotrophic lateral sclerosis**. A man of 40 fell from a height, landing in a sitting posture, at the same time fracturing his right foot. For some time he was regarded as a subject of traumatic hysteria. Two years subsequently he showed weakness and a spastic, dragging gait, with exaggerated knee-reflexes and marked atrophy of the muscles. Sensation intact.

P. Stolper⁶ found that **bleeding in and about the spinal cord** occurs in nearly all severe injuries of the vertebrae. Extradural bleeding is rarely extensive and does not exert much compression upon the cord. Intramedullary bleeding is most common in the cervical cord, and may occur without apparent injury to the vertebrae. It usually affects the gray matter and extends in an axial direction. It is probably produced by stretching of the cord.

S. A. Lord⁷ reports 2 cases of postoperative neurasthenia. One showed feelings of disturbed sensation after ventrofixation; the other had a psychosis with definite delusions and much mental depression.

R. Harvey Reed⁸ reports 7 cases of **postoperative insanity** in females and 2 in males, in which the patients had suffered from mental aberration after operation. There was nothing to indicate that septic influences were the cause. In 1 case the patient was demented before operation, and after a fracture of the arm, received some time before, had become maniacal. Decided improvement was noted after performance of a nephrectomy. The other cases had not shown insanity previous to operation.

Piqué⁹ calls attention to the necessity of ascertaining full particulars as to the history of cases of **postoperative psychoses**, so as to avoid wrongly attributing to an operation what was due to antecedent conditions. In addition, we have to eliminate toxic and alcoholic delirium, as well as that due to iodoform-poisoning and sepsis. The cases are most common in children, old persons, hysterical persons, and those having neurotic tendencies.

L. Thoinot¹⁰ contributes a valuable article upon **traumatic pneumonia**. He would exclude from this category injury of the lung from inhalation of foreign bodies, as well as stab- and bullet-wounds of the lung, and limit the term to pneumonia caused by contusion or by laceration from the ribs. Such cases constitute about 4.4% of all pneumonias, and the mortality is about 1 in 3. The initial symptoms are apt to be insidious; but rigors occur in one-third of the cases. Expectoration of pure blood is an early symptom. The

¹ Monats. Unfallheilk., Mar., 1898.

² Münch. med. Woch., Feb. 8, 1898.

³ Berlin. klin. Woch., Heft 12, 1898.

⁴ Boston M. and S. Jour., June 23, 1898.

⁵ Soc. de Chir., Feb. 23, 1898.

⁶ Arch. f. Unfallheilk., Band ii., 1898.

⁷ Arch. d'Hyg. pub., Dec., 1897.

⁸ Monats. Unfallheilk., Feb., 1898.

⁹ Jour. Am. Med. Assoc., Aug. 27, 1898.

¹⁰ Ann. d'Hyg. pub., July, 1898.

disease always develops on the injured side, and cases following trauma of remote parts, except where septic embolism has resulted, are regarded as apocryphal. The relative variety of pneumonia as a sequel of injury to the chest and fractured ribs is worthy of notice. Ecchymosis of the lung is found post-mortem. The author records 4 recent cases. Lescudi¹ has tabulated 47 cases of traumatic pneumonia, and added 2 personal observations.

Ellers² reports a case of **pleurisy and bronchitis** after injury. A man of 57 fell backward 6 feet through a trap-door, bruising the chest-wall beneath the left shoulder-blade. Two days later a well-marked localized pleurisy and a moderately severe bronchitis developed over the site of injury. Recovery took place in 3 weeks.

I. McDill and C. Van Alstine³ report a case in which a man suffering from chronic "grinders' phthisis" became rapidly worse within a few days after receiving a moderately severe contusion of the chest, and died in 35 days. There was no evidence at the autopsy of ecchymosis about the seat of the injury; but the authors conclude from the history that the injury was the probable exciting cause of the fatal result. [There is some want of definiteness as to the pathologic nature of the process in the lung.]

Vogler⁴ reports a case in a man of 40, in whom **hernia of the lung** had resulted from a severe crush of the chest, received when a boy, which left a defect in the bony wall. The condition arose during a paroxysm of coughing. The tumor is reducible. Its existence does not tend to shorten life, but precludes heavy labor. Trusses are not well borne, corsets answering better. Plastic operations are not recorded in cases in which the bone was defective.

Traumatic Heart-disease Cases in the Prussian Army from April, 1892, to Sept., 1896.⁵—In all 8 cases were recorded in which murmurs appeared after injury. No. 1. An officer thrown off horse, striking chest; after some days, oppression and palpitation, muffled first sound, with dull murmur at apex and base (Benzler). No. 2. Contusion of left chest from fall of horse; diastolic murmur, disappearing and replaced by systolic (Kecker). No. 3. Ruptured aortic valve (?); injury to chest from padded bayonet (Adrian). No. 4. Rupture of mitral (?) from a blow received over the heart (Künow). No. 5. Hoof-blow over heart; traumatic mitral endocarditis (Treger). No. 6. Fall; mitral endocarditis and pneumonia following right pleurisy. No. 7. Hoof-blow (Reinbrecht); hemopericardium. No. 8. Fall from window; pneumopericardium and pericarditis.

F. Wildebrand⁶ has analyzed 222 heart-cases in Gerhardt's clinic, and found 14 in which mechanical injury played some part in causation. In half of these the effect was indirectly associated with other more likely causes. In the others the circumstances were: 1. Fall of 20 meters, striking chest on a beam. 2. Forty-four-year-old man; crush of left side of chest by truck. 3. Fall from fourth story. 4. Thirty-three-year-old man, roofer; fall, breaking left ribs. 5. Thirty-seven-year-old man; fall on plank. 6. Railway collision, contusion of chest. The diagnoses of the lesions are not clearly stated and the dates are not well established. A full bibliography is given.

E. Litten⁷ also reports a case of traumatic valvular disease.

W. Friedreich⁸ reports a case of **acute heart-dilatation** from overwork, with an interesting review of our present knowledge. The author is of

¹ Thèse de Paris, 1898.

² Railway Surgeon, Jan. 11, 1898.

³ Aertl. Sachverst. Zeitung, No. 19, 1898.

⁴ Münch. med. Woch., Heft 1, 1898.

⁵ Monats. Unfallheilk., Mar., 1898.

⁶ Monats. Unfallheilk., Heft 6, 1898.

⁷ Thesis, Berlin, 1898.

⁸ Wien. klin. therap. Woch., Hefte 2 and 5, 1898.

opinion that patients should be reported as unfit for heavy work when there is evidence of dilatation.

Rupture of Aortic Aneurysm in Accident Life-insurance Suit.

—J. N. Hall¹ reports a case in which suit was brought against a company, death occurring suddenly in the night and the deceased being found lying on his face, with slight bruises on the bridge of the nose and the forehead. It was claimed that rupture had occurred from a fall. The policy stipulated that if death occurred while the deceased was afflicted with disease or bodily infirmity, there could be no compensation. The verdict was in favor of the company.

Abdominal Injuries.—Trauma as a Cause of Appendicitis.

W. B. Small² reports 3 personal cases and 9 others, in all of which appendicitis followed soon after injury to or strain of the abdomen. The interval between the injury and the development of the symptoms was 24 hours in 2 cases, 48 hours in 3, 3 days in 3, 4 days in 3, and 15 days in 1 case. [We have reported elsewhere³ 2 cases in which lawsuits were brought for damages in fatal appendicitis following injury to the abdomen.]

Traumatic Ulcer of the Duodenum.—Pauly and Reichel⁴ report the case of a previously healthy man who gave his body a sudden jerk backward to prevent a fall, and felt pain in the upper part of the abdomen; 8 weeks later he suffered from sudden abdominal cramps and died in a few days. At the autopsy rupture of an ulcer of the duodenum, $\frac{1}{2}$ cm. from the pylorus, was found, the adhesions with the liver having evidently broken down. A report by Pontiek stated that the ulcer had commenced by degeneration of the muscular coat, as the external opening was the larger. This he explained as due to compression of the duodenum by muscular strain. Reichel held the [more probable] view that the ulcer had preexisted, and that rupture had occurred at the time of the fall.

Beteke⁵ reports the case of a man of 53, in whom **dislocation of both kidneys** occurred as the result of a fall from a wagon, his back striking against one of the wheels. He thinks it probable that a tendency to movable kidney had preexisted. After the accident there was hematuria; cystic enlargement of one kidney was diagnosed clinically. Death occurred 3 years later. No autopsy.

Schwartz⁶ summarizes the **gynecologic effects of accidents** and critically reviews the important paper by Thiem.⁷ He considers that although retroflexion, apart from pregnancy, rarely occurs as a result of accident, it occasionally does so, and cites cases. Ante-flexion and anteversion do not occur from injury. Prolapse may be immediately induced by such causes as heavy lifting, falls, or straining, if the necessary predisposing conditions exist. Hematoma of the vulva, vagina, or rectum are rarities, only a few cases being recorded. Hematocele is extremely rare. Injuries to the normal uterus are practically unknown; if it is enlarged from tumors they may occur. The pregnant uterus is also liable to injury. Rupture is rare, especially in early pregnancy. Placenta prævia, contrary to common belief, is to be regarded as rarely due to overexertion or injury, and it is doubtful if accident or overexertion is an important factor in bringing on its premature separation. Subinvolution is not to be explained as the result of accident or overexertion. Diseases of the adnexa or aggravation of an existing condition from accident cannot be regarded as established if gonorrheal infection can be demonstrated,

¹ Med.-Legal Jour., Sept., 1898.

² Med. Rec., Sept. 10, 1898.

³ Phila. Med. Jour., p. 1076, June, 1898.

⁴ Aertzl. Sachverst. Zeitung, Hefte 2 and 6, 1898.

⁵ Monats. Unfallheilk., S. 7, 1898.

⁶ Aertzl. Sachverst. Zeitung, Hefte 4 and 5, 1898.

⁷ Monats. Unfallheilk., S. 304, 1897.

and otherwise can only be admitted if pain is felt immediately; the influence of menstruation, coitus, etc., must be remembered. Bleeding of the uterine adnexa, if due to rupture of an ectopic gestation, does not call for compensation. Bursting of ovarian tumors may occur. For proof of this the injury must be considerable and the existence of spontaneous causes for the condition excluded. Torsion of the pedicle cannot be recognized as an effect of accident. Tumors of the genitals, of whatever nature or location, are not admitted by the author as due to accident.

Traumatic Ventral Hernia.—J. B. Blake¹ reports 2 cases. The first was from a blow of a crowbar, causing a small wound in the right groin, from which a piece of omentum protruded; operation; recovery. In the second case the patient fell, striking his right side against the ground, and next day a large swelling appeared, which subsided in a few days. The muscles were found not to be ruptured.

Osseous System.—Osteomalacia after Injury.—Thiem² reports the case of a woman, aged 35, well formed and very healthy. After childbirth her health had always been normal. She fell and broke the neck of the femur, and within 10 weeks showed signs of commencing osteomalacia, which subsequently became well marked. The urine was always very rich in phosphates. In previously reported cases the possibility of pregnancy as a cause was not excluded.

MEDICOLEGAL TESTS.

F. Abba³ reports very favorable results obtained by Gosio's⁴ **biologic test for arsenic**, which depends upon the production of the characteristic garlic odor when *Penicillium brevicaulis* grows in the vicinity of substances containing arsenic. It was found that of hides treated with arsenical solutions, fragments 1 mm. square gave the reaction; whereas with the same sample a piece 5 cm. square was required in order to give results with Marsh's test [that infinitesimal particles will give pronounced odors we know to be the case with musk, etc.]. The method employed was to bore small holes in slices of potato placed in Petri dishes, place the suspected substance in them, and sterilize in the autoclave. The holes were then filled with a suspension of spores of *P. brevicaulis* in sterilized water. The odor was well marked at the end of 24 hours at room-temperature. In this way 142 objects were easily tested in 3 days, the positive results being confirmed subsequently by chemical analysis in each instance. Abba tested over 50 (unspecified) fluid and solid chemicals, with negative results, except in the case of certain samples of copper sulphate and ammonium tartrate, which were found subsequently on chemical examination to contain traces of arsenic. In the presence of sublimate and potassium bichromate the penicillium only grew when kept at a distance, and would not grow at all in the presence of carbolic acid, thymol, etc. A positive result was obtained with the urine of a man under arsenical treatment, and also with washings of some illuminating-gas which contained it. [The test appears from its simplicity likely to prove of great value in medicolegal work.]

W. F. Whitney⁵ confirms Richter's statement that the **Florence reaction** depends upon the presence of cholin, a product of the decomposition of lecithin, and states that the reaction can be readily obtained from suprarenal tissue, which is rich in lecithin, if allowed to stand for some time. It can also

¹ Boston M. and S. Jour., Oct. 27, 1898.

³ Centralbl. f. Bakt., Abth. ii., Nov. 1, 1898.

² Monats. Unfallheilk., Oct., 1898.

⁴ Rivista d'igiene, p. 201, 1892.

⁵ Boston M. and S. Jour., Apr. 28, 1898.

be obtained from decomposing yolk of egg, as stated by Richter. [These circumstances in no way lessen the value of the reaction as a preliminary test.] G. Cruz¹ finds that the presence of urine lowers the sensitiveness of the reaction from $\frac{1}{200}$ to $\frac{1}{20}$.

Berster² reports the result of examinations of the stools of new-born infants to determine the length of time during which meconium persists. Instead of disappearing in 24 hours, as stated by von Hoffmann, it usually persisted from 2 to 4 days, and in some cases for 5 or 6 days. The earlier the child was put to the breast the sooner it disappeared.

G. Corin³ has studied the length of time during which certain articles can be recognized in the stomach after ingestion. Coffee was found to disappear almost immediately when swallowed with food. Hence in a case cited some fluid resembling coffee, found in the stomach at least several hours after a meal, was held to be more probably blood swallowed some time previously from an injury which fractured the nasal bones.

Regneault⁴ finds that the finger-nails of the hand most employed are 0.5 to 2 mm. broader than those of the opposite hand in over 95% of persons examined. The hand itself is also larger; but this difference was less easy to establish. As corroborative evidence of *right-* or *left-handedness* the test should be useful.

Gregoire⁵ says that as a result of **the hand of hat-pressers** during the preparation of the fur being soaked in solutions of acid mercury nitrate, it shows yellowish staining and hardening of the palmar tips of the fingers, with black creasing at the junction of the hand with the wrist. The fingers are thick and stunted, and a reddish callosity forms over the nails and on the knuckles of the fingers, the knuckles of the thumb being free.

C. Ipsen⁶ recommends, for dissolving old **blood-stains**, absolute alcohol to which roasted copper sulphate has been added. This is kept for several days at blood-temperature, and then shows a slightly acid reaction and brown tint. The fluid can be examined directly with the spectroscope or after rendering it alkaline. Insoluble residues treated with strong sulphuric acid give the hematoporphyrin spectrum. The residue obtained by evaporating the alcoholic extract cannot be tested for hemin crystals until the sulphuric acid present is got rid of by means of barium chlorid.

E. Seifert⁷ reports an important **modification of the guaiacum blood-test**, by which its chief defect, that of reacting with certain other substances, is overcome. These substances are got rid of, through the successive action of heat, acids, and alkalies, by means of the following technic: (1) Dissolve the blood-spot in a porcelain dish with 3 to 6 c.c. of absolute alcohol, adding 8 to 10 drops of concentrated sulphuric acid. (2) Boil briskly on a water-bath. This prevents the organic matters afterward exercising a disturbing influence and brings the blood into solution as acid hematin. (3) Add 30% caustic potash till reaction is decidedly neutral; at neutral point a precipitate (neutral hematin) appears, and on becoming alkaline the color changes from brown to green. The alkalization prevents subsequent interference by inorganic salts. (4) Neutralize with weak sulphuric acid; most of the hematin is precipitated, but sufficient remains dissolved by the potassium sulphate to give the reaction. Before and after the last neutralization the solution may be filtered and the test applied to the filtrate. Especial stress is laid

¹ Ann. d'Hyg. pub., Feb., 1898.

³ Arch. d'Anthrop. crim., July, 1898.

⁵ Ann. d'Hyg. pub., Feb., 1898.

² Thesis, Bonn, 1898.

⁴ Soc. d'Anthrop., Feb. 3, 1878.

⁶ Viertelj. ger. Med., Jan., 1898.

⁷ Ibid., July, 1898.

upon the heating as a means of destroying substances which are ordinarily sources of error. G. Puppe¹ points out that equal parts of formalin and absolute alcohol make a good solvent for old blood-stains, the solution being in the condition of alkaline hematin. M. Richter² has employed with success glycerin-pepsin solution in the histologic examination of old blood-stains, as it dissolves the fibrin and has very little action on the albumin of the corpuscles; acidification is not necessary.

H. Hirschfeld³ has studied the **comparative morphology of leukocytes**. Although the granules in the blood of the domestic animals are by no means as large as those of human blood, the results are too much influenced by slight variations in the technic to be available at present for forensic purposes.

R. Magnamini⁴ finds that the recognition of **menstrual blood** is facilitated by addition of 1% of sodium chlorid, to which acetic acid has been added. This precipitates the mucin usually present, while bringing out clearly the cellular elements. Strong acetic acid added direct to fabrics stained with menstrual blood tends to form crystals of sodium acetate. A bold plan is recommended in the same monograph for distinguishing human from animal blood. This depends upon the fact that solutions of potassium hydrate decompose hemoglobin much more readily in human blood than in that of the dog, horse, or sheep. This can be shown quantitatively by the length of time in which hemoglobin solutions of corresponding strengths are decomposed under the influence of $\frac{N}{10}$ KOH. The comparison is made by spectrophotometry, taking the breadth of the E band as a basis. With fresh blood and with samples dried from 7 to 60 days the animal hemoglobin resisted the action of the caustic alkali 3 times as long as human blood in the case of dogs, and over 6 times in the case of the calf, horse, or sheep.

Medicolegal Value of the X-rays.—G. H. Stover⁵ does not think that the skiagram should be admitted as direct evidence to be placed before a jury. In impacted fractures without deformity no trace of the injury may be seen, and an ankylosed joint where the adhesions are fibrous may appear normal. G. W. Craig⁶ has shown that a callus, even of some weeks' standing, may not be visible. Bergmann⁷ reports 2 cases—a young man and a woman—in which bullets in the brain were located by means of the X-rays.

The article on the **X-rays from a medicolegal standpoint**, by Harvey Reed,⁸ as well as that by J. W. White⁹ as to its surgical uses, and that by F. Williams on its employment in medical diagnosis, are all worthy of careful study.

TOXICOLOGY.

The monographic article by A. Lesser,¹⁰ on the **distribution of poisons in the body**, forms probably the most complete information we have on the subject, comprising the result in 243 cases, including all the common and many rare forms of poisoning.

E. J. Bartlett¹¹ says that in the **Marsh case of arsenic-poisoning** the stomach showed extensive necrosis of the mucosa. The analysis showed arsenious oxid distributed as follows: Stomach, 31 mg. in contents and 48 mg. in tissues; intestines, 32 mg. in contents and 14.85 mg. in tissues; liver, 28.14

¹ Versamml. Naturforscher, 1898.

² Virchow's Archives, Band cxlix., 1897.

³ Phila. Med. Jour., Oct. 15, 1898.

⁴ Berlin. klin. Woch., Heft 18, 1898.

⁵ Am. Jour. Med. Sci., Jan., 1898.

² Ibid.

⁴ Bull. Soc. Ospedali di Roma, xvii., 2.

⁶ N. Y. Med. Jour., May 7, 1898.

⁸ Jour. Am. Med. Assoc., Apr. 30, 1897.

¹⁰ Viertelj. ger. Med., Jan. and Apr., 1898.

¹¹ Boston M. and S. Jour., May 26, 1898.

mg.; kidneys, 5.86 mg.; brain and cord, 4.05 mg.; urine, 0.375 mg.; total, 165 mg., or 2½ gr. (See also Abba on Gossio's biologic test for arsenic, p. 982.)

Schlagdenhaufen and Pagel¹ announce a new method for the **destruction of organic matter** in toxicologic work. For each 100 gm. of organic matter take 20 gm. of a mixture of 2 parts of sodium chlorid and 1 part of potassium bichromate; add 50 gm. of sulphuric acid, and heat. After heating in a retort a current of hydrogen sulphid is passed, which precipitates the arsenic. This method is specially serviceable in the presence of glycerin and also enables the latter to be estimated. To obtain destruction of organic matter in toxicology, Villiers, after digesting in hydrochloric acid, adds a manganese salt with nitric acid in small quantities. This is easier managed than potassium chlorate.

R. Richter,² in an **examination of healthy urines for arsenic**, analyzed the urines of 20 persons in Berlin, with completely negative results. Taken in connection with the result of Putnam in America, who found traces of arsenic in 20% of all urines tested, this is considered to show that suppression of all sources of adulteration and contamination by arsenic is being satisfactorily accomplished in Prussia.

Widal and Nobécourt³ have studied the **antitoxic action of nerve-tissue on strychnin**. By mixing 0.25 cgm. of brain-substance with an ordinarily fatal dose of strychnin or morphin injected hypodermically, the animal remained alive even when double or treble the fatal dose was given. Wassermann⁴ has shown that nerve-tissue possesses to a certain degree antitoxic properties against tetanic virus. Thoniot and G. Bronardel⁵ found that animals were kept alive by injecting an emulsion of normal nerve-substance previous to giving a lethal dose of strychnin.

Brieger and Uhlmuht,⁶ in a study of **blood-poisons and organ-poisons**, found that the blood of man, sheep, pig, ox, and rabbit contains toxins; horse-blood alone is free from this toxicity. Organ-juices contain different toxins and different protective substances from the blood. [The subject treated of is an extremely complicated one, and will need to be studied in the original.]

G. Cruz⁷ has studied the **toxic effects of ricin**, with results confirmatory of those obtained a year previously by S. Flexner,⁸ as to the occurrence of focal necroses and karyolytic changes, particularly in the liver.

Hobhouse⁹ reports an unusual case of **lead-poisoning** from douching the nose with a solution of lead acetate.

C. McCoy and F. M. Michael¹⁰ have observed amaurosis from poisoning by 120 c.c. of **wood-alcohol**, resulting in optic neuritis followed by atrophy.

W. Laub¹¹ found glycosuria in 2 out of 3 cases of acute **phosphorus-poisoning**.

Müller¹² reports a case of **bromoform-poisoning** in a boy of 2 years, who drank 6 gm., causing symptoms of deep coma, with death by asphyxia. At the autopsy the blood was fluid and the organs cyanotic. The bibliography of 10 other cases is cited.

Kuhlmei¹³ has written on prussic-acid and **cyanid-poisoning**, giving a well-written, critical review of the subject.

¹ Ann. d'Hyg. pub., July, 1898.

² Sem. méd., p. 93, 1898.

³ Soc. des Hôp., Mar. 25, 1898.

⁴ Ann. d'Hyg. pub., Oct., 1898.

⁵ Brit. Med. Jour., Feb. 19, 1898.

⁶ Wien. klin. Woch., Jan. 13, 1898.

⁷ Viertelj. ger. Med., Jan., 1898.

⁸ Viertelj. ger. Med., Apr., 1898.

⁹ Ibid., p. 11.

¹⁰ Deutsch. med. Woch., Mar. 10, 1898.

¹¹ Jour. Exper. Med., Mar., 1897.

¹² Med. Rec., May 28, 1898.

¹³ Münch. med. Woch., Sept. 20, 1898.

J. A. Ottie¹ reports a case of **naphthalin-poisoning**. Eight gr. were taken. Diarrhea, tenesmus, vomiting, and strangury were present, and blood and albumin were found in the urine. Recovery took place in 4 days.

Masius and Maheim² have studied the optic and retinal changes in **male-fern poisoning**. In experiments on 15 dogs only vascular changes were noted.

G. Klugh³ reports a case of fatal **lysol-poisoning** in a woman of 35, who swallowed 10 gm. of lysol. The symptoms were coma and heart-failure. A doubtful case, following an intrauterine injection of a 1% lysol solution, in a primipara of 22, is reported by H. Cramer.⁴

G. Cruz,⁵ working with Ogier, found that in the blood of animals poisoned by illuminating-gas, traces of the carbids of hydrogen were constantly present. The exact nature of these could not be determined, owing to their small amount; but by electrolysis they were convertible into acetylene, easily recognizable by ammoniocuprous chlorid. In animals poisoned by the vapors of wood, coke, or anthracite burned in a stove no traces of carbids were found. It is claimed that these afford a means of distinguishing poisoning due to illuminating-gas from carbon-monoxid poisoning from other sources. [It has been shown, however, that gas filtered through soil loses its carbids.]

Ledetch⁶ reports a case of multiple **carbon-monoxid** poisoning of a family in bed, from gas given off by a stove. The wife died and the husband was severely ill. A child, 4 weeks old, in a cradle 25 cm. lower in level than the bed, showed no ill effects. The cradle was covered with a cloth.

Death from Chloroform.—F. Strassmann⁷ relates unpublished experiments, made in 1891, showing fatal after-action of chloroform, with fatty degeneration of the organs, in 4 out of 17 cases. As we cannot foresee which cases will react badly with chloroform, and as fatal accidents happen even with the greatest care, no ordinary negligence, however blamable, can be positively stated to have caused death. Hence malpractice would only be proved in case of enormous dosage or neglect to free the orifices from obvious causes of obstruction, etc. Fatal accidents during administration are specially liable to occur in persons with the lymphatic condition, enlarged thymus, etc. Impurity in the drug itself is rarely a cause.

Loranz⁸ found that poisonous gases are evolved by contact of chloroform-vapors with the **Auer incandescent light**. A case is cited in which the physician and nurses, after an operation lasting 3 hours under such conditions, were all taken ill with cyanosis, difficulty of respiration, and cough, accompanied by alarming collapse. One nurse died after 28 hours. At the autopsy the results were negative. No analysis.

R. Bachfeld⁹ records the conclusions from 63 cases of **poisoning by anilins and benzols**. Exposure to the fumes for over 10 minutes is always dangerous, and there is danger of poisoning if clothing soaked with them is in contact with the body. Wearing a respirator moistened with vinegar affords much protection. Cyanosis is a very early as well as characteristic symptom.

Effect of Nitrous and Nitric Vapors.—R. Kochel¹⁰ reports the case of a man of 65, the subject of arteriosclerosis, who was exposed for one hour to strong nitrous vapors, and was attacked 6 hours later with cough, dyspnea, and cyanosis, dying in a few hours. At the autopsy intense congestion of the lungs without consolidation was found. A young and healthy man equally exposed

¹ Med. Rec., Apr. 30, 1898.

² Münch. med. Woch., July 12, 1898.

³ Ann. d'Hyg. pub., May, 1898.

⁴ Berlin. Klinik, Feb., 1898.

⁵ Viertelj. ger. Med., Apr., 1898.

⁶ Acad. Belge. de Méd., Jan. 29, 1898.

⁷ Centralbl. f. Gynäk., 39, 1898.

⁸ Aertzl. Sachverst. Zeitung., July, 1898.

⁹ Zeitz. f. Med.-beamte., Mar., 1898.

¹⁰ Ibid., Jan., 1898.

on the same occasion suffered no ill effects. Experiments upon rabbits showed bronchopneumonia with, often, thrombi in lungs and veins; also ulceration of stomach or duodenum.

Botulism.—Kempner and Pollack¹ report the results of experiments with *Bacillus botulinus*. A toxin was isolated capable of producing diarrhea, fever, and collapse. The authors were also able to prepare an antitoxin from the serum of immunized animals. A series of degenerative changes were recognized in the nerve-cells of the infected animals, but were absent in those protected by the antitoxin.

J. A. Wesener and W. L. Rossmann² detected **tyrotoxicon in cheese**. Persons eating the cheese had suffered from nausea, diarrhea, and dryness of the throat. Injection into animals of acicular crystals obtained from an alkaline ethereal solution produced diarrhea.

SEXUAL AND OBSTETRICAL—INFANTICIDE.

L. Thoinot³ has written the latest monograph on the subject of **sexual perversion** and indecent assault.

Pierling⁴ reports a case in which a teaspoonful of **oxalic acid** dissolved in water was injected into the vagina with the object of committing suicide. It caused a severe inflammation, followed by stenosis. No general toxic symptoms occurred.

Calmann⁵ calls attention to the necessity for personally testing the **sensitiveness of the genitals**, with the object of trying the accuracy of statements made as to what was felt, for instance, during an attempt at abortion. It is rarely that the patient can form a true idea as to exactly what part is touched.

R. de Bovis⁶ gives an exhaustive review of the subject of **foreign bodies in the uterus**.

A. Veitch⁷ reports a case in which alarming symptoms of shock followed an intrauterine injection of **glycerin**.

Bond⁸ reports a case of **rupture of the uterus** induced by ergot; 5 gr. of the powder were given. [The case seems improbable.]

G. Corin⁹ reports a case in which **expulsion of the ovum** occurred 57 days after rupture of the membranes. He cites a case by Lebrun of 4 to 6 weeks interval, and one by Hendrix of 5 to 6 weeks.

Charles Kevin¹⁰ reports a case of intrauterine respiration. The child was heard to cry 30 hours before delivery.

L. Tissier¹¹ reports a case of **rupture of the umbilical cord in precipitate labor**. The woman was delivered standing. The rupture was situated 1 cm. from the umbilicus, and the end of the cord had all the appearances of an absolutely clean cut made with scissors, the sheath being free from irregular laceration. Had not the delivery occurred before a number of witnesses in the hospital-ward the cord would certainly have been regarded as being divided by incision.

Injuries to the Fetus.—A. D. Wilkinson¹² reports a birth in an epileptic multipara, aged 25, with shortening and angular deformity of the right femur of the child, with a cicatrix in the skin opposite the middle third.

¹ Deutsch. med. Woch., 32, 1898.

³ Paris, 1898.

⁵ Ibid., Band iv.

⁷ Edinb. Med. Jour., Jan., 1898.

⁹ Rev. de Méd. lég., June, 1898.

¹¹ Soc. de Méd. lég., Nov. 14, 1898.

² Phila. Med. Jour., June 11, 1898.

⁴ Arch. f. Gynäk., Band liv.

⁶ Sem. méd., 1898, p. 115.

⁸ Deutsch. med. Woch., May 26, 1898.

¹⁰ Brit. Med. Jour., May 14, 1898.

¹² Jour. Am. Med. Assoc., Sept. 3, 1898.

O. Kustner¹ emphasizes the importance of including **examination of the placenta** as part of the autopsy on new-born infants. It is more common to find the explanation of the cause of death in the placenta than in the fetus itself.

A. Nordmann² found **pressure-necroses** over the trochanters and heels of 2 new-born children, a condition which would be very likely to give rise to erroneous suspicions of violence or neglect if its true nature were unrecognized.

Perforation of the Intestines in the New-born.—S. Ciechanowski³ reports the case of a female child born in natural labor. It was put to breast on the second day, and then first passed meconium and feces. It died of peritonitis on the fourth day. A peculiar oval opening 1 cm. in diameter was seen in the transverse colon, representing a congenital defect, closed only by a thin membrane, which had afterward torn through. The bowel above was distended. Similar cases are recorded by Browicz, 1882; A. Paltauf, 1888; Zillner (4 cases), 1884; and Breslau, 1863.

R. Koehl⁴ claims that microscopic examination of the umbilical cord of new-born infants may indicate live birth where naked-eye appearances are masked by decomposition. A sharply defined leukocytic infiltration indicates commencing separation. In still-birth a diffuse axial infiltration of leukocytes may occur.

MENTAL.

At a discussion before the Ninth Congress of French Alienists and Neurologists, 1898, Vallon dealt with the question of **transitory mania**. The medicolegal study of this condition presented unusual difficulties, owing to the fact that the investigation was made when the mental conditions usually no longer existed. He found, however, that careful inquiry always elicited some evidence of antecedent mental or nervous infirmity in genuine cases. This was disputed by Charpentier, who held that a transitory attack may occur in normal individuals. The interesting feature of this discussion was that Charpentier, being asked to cite a case of this kind, found himself unable to do so. The congress thereupon passed a resolution supporting the stand taken by Vallon.

In a discussion before the British Medical Association upon **aphasia and will-making**, W. T. Gairdner⁵ held that an aphasic may be perfectly capable of making a proper will, the extent to which this capacity exists depending upon his freedom from insanity or mental confusion such as would prevent his doing so. The effect of aphasia he regards as shifting the *onus probandi* as regards capacity for will-making onto the testator, instead of upon those wishing to dispute the will. It is important to be able to shown that the mind was sufficiently clear at the time. Wm. Ekler⁶ held that complete auditory (sensory) aphasia, as it includes word-deafness and word-blindness, precludes the making of a will; that a patient with visual (sensory) aphasia would be capable of making a will if the contents were read to him or he wrote them himself; that motor aphasia and graphic aphasia may render a patient incapable of making a will, not from mental incapacity, but from inability to comply with the legal formalities, which necessarily vary with the laws of the particular country; that simple cases of infrapictorial aphasia are capable of

¹ Viertelj. ger. Med., Jan., 1898.

² Viertelj. ger. Med., Oct., 1898.

³ Brit. Med. Jour., Sept. 3, 1898.

⁴ Centralbl. f. Gynäk., Heft 45, 1897.

⁵ Beiträge z. path. Anat., Band xxiv.

⁶ Ibid.

valid will-making; that in any of the above conditions associated lesions may exist that render the patient incapable.

I. Scott¹ discussed the bearing of the **prisoner's inability to speak** in criminal trials. A deaf-mute was accused of murder, and the case was not proceeded with because he was unable to make the usual formal answer to the accusation.

Clark Bell² investigated the supposed connection between **cigarette-smoking and insanity** by writing to a large number of asylum-superintendents, who all, with one exception, replied that they had never met with any cases of insanity from this cause. The man who claimed to have seen such a case did not give the details and would not allow his name to be published.

Schlesinger³ describes the **psychic symptoms of iodoform-poisoning**: (1) In the acute form, lasting from 1 to 2 weeks, confusion and misplacing of words occur, with restlessness and anxiety [no mention is made of maniacal delirium, which sometimes occurs]; the physical symptoms are thirst and muscular twitchings, hematuria, and albuminuria, with skin-eruptions and sometimes jaundice. (2) The chronic form is like melancholia, with hallucinations; and sometimes delusions may appear in from 2 to 10 weeks after commencing use of the drug. (3) The grave form, with stupor, coma, and rigidity of the neck, as in meningitis; children are specially subject to this form of intoxication. Autopsies show fatty degeneration of the heart, kidneys, and liver.

Kirn⁴ found that of a series of 41 criminals considered to have a condition of lessened responsibility not amounting to actual insanity, 14 showed congenital mental and moral deficiency (? (Schwachsinn), 4 sexual perversion, 9 psychic epileptic degeneration, 1 hysterical neurosis, 1 traumatic brain-lesion, 3 chronic alcoholism, and 9 beginning senile dementia.

Medicolegal Aspects of Hypnotism.—S. Kuh⁵ comments upon the scarcity of cases in which criminal objects were attained by hypnotism, and concludes that there is more danger in its experimental use than in its employment for criminal purposes.

¹ Brit. Med. Jour., Dec. 1, 1897.

² Med.-Legal Jour., Mar. and Sept., 1898.

³ Zeit. f. Psych., Band liv., 1893.

⁴ Viertelj. ger. Med., Oct., 1898.

⁵ Am. Jour. Med. Sci., Dec., 1898.

PUBLIC HYGIENE AND PREVENTIVE MEDICINE.

By SAMUEL W. ABBOTT, M. D.,

OF BOSTON, MASS.

THE MANAGEMENT AND CONTROL OF INFECTIOUS DISEASES.

The Control of Measles.—A. Newsholme,¹ Medical Officer of Health of Brighton, England, in an excellent paper on the control of measles, says: "In the majority of cases a low ethical standard on the part of parents, as regards responsibility for the spread of disease, is the cause of epidemics which occur in connection with schools; and I heartily wish we could secure the aid of clergymen in educating the public conscience on this point. Until the standard of conscientious conduct is raised in this respect, our efforts to minimize the spread of the intermittent epidemics of measles can only be partially successful. That is no more a reason for discontinuing or relaxing their efforts than would the occasional failure to prevent the occurrence of a large fire be a reason for discontinuing to spend money on fire-preventing appliances and staff. The analogy is further suggestive, because in both instances the failure to secure success is generally caused by lack of early information. This raises the general question whether the compulsory certification (notification) of measles by physicians would produce results commensurate with the expenditure,² which would probably be as heavy as for all the other certifiable diseases together. I believe that the addition of measles to the list of diseases under the Notification Act would only be so successful as to render it desirable under 2 conditions: (a) That dual notification, by the parent or guardian as well as by the doctor, should be enforced; and (b) that a modification of the Act should be secured, with at least this alteration, that only the first case of measles occurring in a household within 6 weeks should be notifiable by the practitioner; but that this exception should not hold good for the householder."

Effect of Sanitary Conditions upon the Fatality of Measles.—J. S. Cameron³ discusses the question of the effect of sanitary conditions on the death-rate from measles. His conclusions are based upon 1302 deaths and 2006 recoveries. The 2006 recoveries were cases in which no death from measles occurred in the same house. His inquiries embraced the questions of air-space, ventilation, number of rooms in each house, provision of water-closets, severance from sewers, and general sanitary conditions. He concludes that: "It would seem, so far as figures are of value, as if ample air-space, free draught, freedom from overcrowding and from effluvium nuisances, conduce most to recovery from measles."

Administration of Infectious-disease Hospitals.—In addition to the usual general regulations for the government of these hospitals, M. Young⁴

¹ Public Health, p. 308, June, 1898.

² A fee is allowed in England for every case of infectious disease notified by a medical practitioner.

³ Public Health, p. 274, May, 1898.

⁴ Jour. Sanitary Inst., p. 74, Apr., 1898.

suggests the following: (1) The ambulance-attendant should be instructed in no case to remove a patient unless he has a medical certificate of fitness for removal, or, what is better, he should take his instructions for removal of cases from the medical officer only, who, in his turn, should insist on this medical certificate. (2) It is as well, considering the doubtful termination of the infectious period in scarlet fever, to send to the parents of each case, on its discharge, a written notice stating that, although every precaution has been taken, it is impossible to guarantee absolute freedom from infection; and therefore the child should not, for a week or two, be allowed to sleep with other children, or be sent to school; but should, if possible, have a couple of weeks in the country.

Conveyance of Infectious Diseases by Means of the Air.—E. Germano¹ reports the results of a series of experiments in continuance of those already reported. The later series relate to diphtheria, erysipelas, and pneumonia. He reports the following conclusions in regard to the spread of diphtheria: 1. The diphtheria-bacillus can resist drying for a long time in the membrane, in the tissues, and when present in dust. 2. Increased rapidity in drying, even by means of sulphuric acid, does not affect the resisting power of the bacilli either in the tissues or in dust. 3. The bacillus survives better the more it is surrounded by dust, probably on account of its greater protection from oxidation. 4. When dried completely the bacillus retains its virulence until it dies. 5. The air can carry diphtheria-bacilli, while living, by means of dust.

With reference to streptococci, he says: 1. The power of surviving the drying process depends largely on the mode in which this is carried out and the material with which it is mixed. 2. At any rate, its power of resistance is great and may continue for months. 3. The rapidity of drying has no effect on the vitality of the streptococci. 4. The resisting power increases with the amount of material in which it is implanted, and which protects it from the air.

With reference to the *Streptococcus pneumoniae*, to which he attributes pneumonia, and sometimes meningitis, pleurisy, and acute nephritis, he concludes: 1. The diplococcus is a microorganism which can resist drying for a long time. 2. It survives better when dried than when moist. 3. As it can under some conditions exist in a dry state for a long time, but not to the same extent as the *Streptococcus erysipelatosus*, the possibility of its conveyance through the air is established.

Infection by Means of Dust.—Max Neisser² details the results of his experiments with dust. Fine dust was first sterilized, then infected with pure cultures of certain organisms, and well rubbed together. This dust was distributed by an air-current and collected. Certain bacteria could not be "carried over" in the dust. He concludes that the following organisms cannot be carried alive by dust for a greater distance than 80 cm. ($\approx 31\frac{1}{2}$ in.) at the ordinary rates of air-currents in dwelling-houses: *Bacillus diphtheriae*, *Bacillus typhi abdominalis*, *Bacillus pestis*, *Vibrio cholerae Asiaticae*, pneumococcus, and *Streptococcus pyogenes*. Dust-infection under the same conditions is possible with *Staphylococcus pyogenes aureus*, *Bacillus pyocyaneus*, *Bacillus anthracis* (spores), and *Bacillus tuberculosis*.

Oysters and Typhoid Fever.—Evidence upon the subject of oysters as a medium of typhoid infection is rapidly accumulating. The following conclusions are from G. S. Buchanan's report to the Local Government Board of England, dated Feb. 19, 1898. The locality from which the oysters were

¹ Zeit. f. Hyg., Band xxv., Heft 3; xxvi., 1.

² Ibid., Band xxviii., Heft 2.

taken was Brightlingsea, on the southeast coast of England, County of Essex. It appeared: 1. That in at least 25 instances the implicated oysters could be referred to layings in Brightlingsea Creek. 2. That though in 5 of these instances the particular Brightlingsea layings which had furnished the implicated oysters could not be ascertained, the facts regarding the remaining 20 instances were sufficient to warrant the inference that the oysters had been taken from one or other of two particular layings in Brightlingsea Creek. 3. That the two layings thus implicated formed part of an oyster-beach which is situated on the foreshore of Brightlingsea Creek, near the outfalls of the three main sewers of the town, a locality conspicuously exposed to pollution by sewage. 4. That at different periods in 1897 infectious matter from persons suffering from typhoid fever at Brightlingsea must needs have been discharged from these sewer-outfalls.

Mussels.—A. Newsholme,¹ Medical Officer of Health of Brighton, England, cites 5 cases of typhoid fever following the eating of mussels gathered from a contaminated harbor. According to Newsholme,² from 30% to 38% of all cases of typhoid fever of local origin occurring in Brighton, England, from 1893 to 1897, were traceable to oysters or other shell-fish.

Typhoid Fever Due to Impure Ice.—Dorange,³ Military Surgeon at Rennes, France, reports an outbreak of typhoid fever which was determined to be due to polluted ice. Eight officers were taken ill with typhoid, and the only common cause to which it could be attributed was a certain ice-supply, from which ice had been furnished at a banquet which the officers attended. The ice was taken from the river Vilaine, below its confluence with the Ille, and at a point below the sewage-outlet of the district. Those persons who did not partake of the iced champagne such as these officers drank were not affected. Other references relative to polluted ice are the experiments of T. M. Prudden, of New York, who found typhoid-fever bacilli still active after 103 days freezing in ice. Fränkel, of Berlin, demonstrated the same fact. In 1882 Chantemesse and Widal submitted typhoid bacilli to freezing without impairing their vitality. M. Riché, of Paris, in 1893, confirmed the foregoing statements; and the sale of ice from polluted sources was forbidden by a decree of the Prefect of the Seine in May, 1893.

Legislation.—Under the provisions of a recent law the Board of Health of North Adams, Mass., decreed that the ice from certain sources in that city was unfit for use and should not be sold. In a general examination of the sources of ice-supply the State Board of Health of Massachusetts found that the organic impurities of snow-ice (upper stratum) amounted to 69% of those of the water from which it was formed. Those of all the ice except the snow-ice were 12%, and those of the clear ice were 6%. There were 81% as many bacteria in the snow-ice as in the water, 10% as many as in all other ice, and 2% as many in the clear ice as in the water. These facts having been determined, the Board "felt bound to warn the public against using ice for domestic purposes that is obtained from a source polluted by sewage beyond that which would be allowable in a drinking-water stream or pond; and that, in general, it is much safer to use, for drinking-water and for placing in contact with food, that portion of the ice which is clear."

Duties of a Health-officer in regard to Notification of Infectious Diseases.—A recent memorandum⁴ issued by the Society of Medical Officers of Health of Scotland contains some excellent suggestions relative to the conduct of the sanitary official in his relations with private practitioners.

¹ Public Health, p. 390, Aug., 1898.

² Ibid., p. 423, Sept., 1898.

³ Rev. d'Hyg., Apr., 1898.

⁴ Public Health, p. 353, July, 1898.

The existence of a good understanding between the medical health-officer and the private practitioner is not only desirable but essential to the efficient control of infectious disease. The health-officer should not take upon himself the duty of reviewing the diagnosis of the medical practitioner as stated in his certificate. He should act on the belief that the certificate is an expression of honest opinion, and this certificate should never be made the occasion of inflicting an injury or professional indignity upon the practitioner. The latter has the advantage in point of diagnosis: he is generally familiar with the history of the patient and his family. To reject his diagnosis must always involve great responsibility. If the circumstances justify the health-officer in assuming this responsibility, he should do so with a clear knowledge of the delicacy of the undertaking, with due attention to professional etiquette and in remembrance of the golden rule.

The Spread of Diphtheria.—The following conclusions are from the final chapter of Newsholme's new work upon *Epidemic Diphtheria* (London, 1898), being a review of its prevalence throughout all civilized countries: "If the occurrence of pandemics of diphtheria is governed largely, if not chiefly, by meteorologic conditions over which we have no control, what scope is there for the intervention of preventive medicine? Before answering this question, let it first be clearly stated that we must have the truth at any cost. If the statement of the truth by implication means that our preventive measures are but Canute-like attempts to stop the inflowing tide, still it is well that the truth should be known. But this is not a correct view of the case. Diphtheria is spread chiefly by **personal infection**. This personal infection is immensely more potent in epidemic than in interepidemic years, a fact which should lead to redoubled efforts to prevent personal infection during such epidemic periods rather than to a fatalistic inertia. Similarly redoubled efforts are required to prevent ground-air from gaining admission into houses, and to render more wholesome the soil in districts in which diphtheria has become endemic. How this can be done in towns; how the soil can, without more open spaces than are obtainable in most of our great cities, be made to resume its virgin salubrity and purity, cannot be stated here. It is one of the greatest problems of public health. But to assume that because we do not yet know how to exterminate diphtheria, or because we cannot hope in our day to be entirely successful in preventing its spread, it is therefore useless to attempt anything, would be as unwise as for a city council to dismiss their fire-brigade staff and dispose of their fire-preventing apparatus because the staff had not been successful in at once extinguishing every fire, or because the city council were impressed with the fact that the present appliances for extinguishing fire are of a very imperfect character."

Gratuitous Distribution of Therapeutic Serum.—The French government has maintained throughout the years 1894, 1895, and 1896 a gratuitous distribution of antidiphtheritic serum in all the departments of France.¹ The amounts distributed were as follows: In 1894, 51,500 doses of 10 c.c. each; 1895, 45,203 doses; 1896, 28,217 doses; total, 124,920 doses. To this should be added about 11,000 doses of antistreptococic and antitetanic serum and as much more for veterinary use. The expense of maintenance for the whole country, including Paris, for the 3 years was 300,000 francs (about \$60,000).

Diphtheria-serum; Advantage of Treatment with, and also of Early Treatment.—P. Hilbert² says that "the streptococcus and the

¹ Twenty-seventh Annual Report of Consulting Committee of Hygiene, p. 305, 1898.

² Deutsch. med. Woch., Apr. 14, 1898.

diphtheria-bacillus enhance each other's virulence, and that diphtheria-antitoxin has no effect after septicemia has developed. Hence the necessity of beginning antitoxin-treatment at the first indications of diphtheria-infection, before the streptococcus has had time to get in its work and increase the virulence of the diphtheria-bacillus and to be reciprocally affected. Theory and practice harmonize so perfectly in antitoxin-treatment that the time is approaching when a death from diphtheria will be among the rarities." In the same issue statistics are quoted by which it is shown that the diphtheria death-rate has fallen in German cities from 106 per 100,000 inhabitants before, to 44 per 100,000 after the introduction of the serum-treatment. There was also a fall in Paris from a total of 1262 deaths from diphtheria in 1893, to only 274 in 1897.

The Spread of Infectious Diseases by Means of Baths and Summer-resorts.—The following propositions were laid down by Battlehner,¹ of Carlsruhe, at the close of a discussion by the German Society of Public Health, with reference to public resorts, camp-grounds, and places where people congregate in large numbers: 1. It is quite possible that summer-visitors may carry and spread infectious diseases at bathing-places and summer-resorts. 2. In such places care should be taken to secure a good water-supply. The buildings should be provided with good sanitary arrangements. The streets should receive especial care, sweepings should be regularly collected and disposed of, and foul water and surface-drainage should receive attention. 3. Where bathing-tanks are in use the water should be frequently renewed and examined. 4. Sanitary police-regulations should be enforced as in other places. 5. Notification of infectious diseases should be required of all physicians as a means of preventing their spread. 6. Disinfecting-apparatus and well-instructed attendants should be provided. 7. If there is no hospital, a separate room should be provided for persons ill with infectious diseases. 8. There should also be a house for the reception of dead bodies.

Notification and Registration of Sickness.—In addition to the systems of registration of deaths which prevail in most civilized countries, A. Newsholme² advocates a national system of notification of sickness, and states the following conclusions: "1. All cases of sickness treated at public expense should be periodically notified to the health-authority. 2. All cases of sickness treated by means of public charity, whether in general or special hospitals or dispensaries, should be similarly notified. 3. All cases of sickness treated in sickness-assurance societies should be similarly notified. 4. Returns of accidents and of certain diseases, as lead-poisoning, trichinosis, anthrax, or other industrial diseases, should be made part of a wider system of notification of diseases by private medical practitioners to the health-officer of each district. 5. Diseases should be classified into those compulsorily notifiable (1) within 24 hours and (2) weekly; and the list of the latter should be greatly increased; they should include pneumonia, rheumatic fever, phthisis, and other diseases, such as lead-poisoning, etc. 6. In connection with this extension of notification the whole question of payment of fees for notifying will require consideration. 7. All notifications of sickness should be sent in the first instance to the health-officer of each district, and by him transmitted to the central office. 8. The central office should be in connection with the General Registry Office, and weekly returns should be published along with the weekly returns of mortality. I can conceive of no work more important in conducting to the progress of both curative and preventive medicine than that which I have briefly described; it is a work of national importance,

¹ Viertelj. f. off. Gesundheit., Band xxx., S. 22, 1898.

² Jour. Royal Statistical Soc., London, vol. lix., part 1, p. 27.

and the securing of this additional information for every district and town, with the present staff of health-officers eager to avail themselves of it, would undoubtedly be followed by marvellous improvement in the public health." [The foregoing conclusions of Newsholme apply equally well to the densely settled portions of the United States as to England.]

Vaccine-laboratories of Germany.—The vaccine-laboratories of Germany are under government control. The percentage of successful vaccinations in Berlin is 96.84; in Hamburg, 94.85. The best laboratory in buildings and equipments is that of Cologne. At Hamburg vaccination of 1700 primaries with "germ-free" lymph gave 8 cases of skin-eruptions. The Imperial Berlin Commission recently reported¹ that, in its judgment, inflammatory appearances are due (1) to the condition of the person vaccinated; (2) to the greater or less amount of effective lymph in the material applied; and (3) to the technic employed in the inoculation. The Commission stated that inflammatory complications are especially frequent if the incisions made in the inoculation are numerous, long, deep, and close together. It is a familiar fact that inflammation is more frequent in secondary than in primary vaccination. It is also unfortunately the case that a number of German reports state that disinfection of the arm by means of sublimate solution and ether before vaccination does not prevent all inflammatory complications, but in some cases has actually seemed to increase them. Nevertheless, it has been a great advantage to vaccine-production that practically "germ-free" lymph may be obtained; because the germs present, while as a rule nonpoisonous, are, it is thought, injurious to the vaccine-organisms; and it is a fact that by employing "germ-free" lymph the so-called "purulence" in the producing-animals, one of the former bugbears of the vaccine-laboratory, has practically disappeared. Laboratory-workers have about come to the conclusion that it is at present impracticable to produce a sterile vaccine; but two different and partially effective methods of lessening the number of germs have been discovered. One method consists of centrifugalization of virus which has been diluted with water; the other, of mixing the virus with varying proportions of glycerin. The former method reduces the number of bacteria present, but does not entirely remove them; the latter is much more effective, and by means of it the number of germs in lymph, as tested by making cultures on agar, can always be materially reduced within a period which varies from a few days to a few weeks. Sometimes this does not secure sterility; but when old glycerinated virus is not sterile, the inference simply is that the germs present are such as resist the action of glycerin; the *Bacillus subtilis*, for instance, which is non-pathogenic, is unaffected by glycerin. It may then be fairly stated that lymph practically, although not absolutely, "germ-free" can be secured with considerable certainty. The results from the use of this so-called "germ-free" lymph have not, however, secured freedom from the inflammatory complications of vaccine. On the contrary, it is the general testimony given by those who have experimented at length with such lymph, that inflammatory reactions occur in about the same proportion of cases as before this lymph was introduced; and also that not merely inflammatory complications are present, but occasionally vaccinal eruptions as well, as has already been stated regarding the Hamburg experiments. Finally, it should be added that while every brand of vaccine has its own bacterial flora, the few germs which are common to almost all are very clearly nonpathogenic to men or animals. Repeated inoculations of germ-bearing lymph have been made in guinea-pigs, rabbits, and other test-animals, and almost invariably without pathogenic

¹ Sanitary Rec., Mar. 4, 1898.

results. For further information on this subject, see the annual reports of the German Gesundheitsamt, entitled *Die Thätigkeit der im Deutschen Reiche errichteten staatlichen Anstalten zur Geweinnung von Thierlymphe*.

Examinations of Vaccine-lymph.—Dreyer has conducted a series of bacteriologic examinations of the vaccine-lymph produced at Giessen.¹ He found, as his predecessors had done, a progressive diminution in the number of bacteria in the glycerinated lymph; at the end of 100 to 120 days the number was reduced almost to nothing.

Regulation of Prostitution.—W. G. MacDonald² says: "After long-continued observation in the hospital-clinics and after visiting most of the public places of amusement I have been forced to the opinion that the regulation and inscription of prostitutes in Paris is not a success from a health standpoint. O. Commenge, *chef* of the dispensary of *Salubrité*, tells us that from 1878 to 1887 there were 27,007 unregistered prostitutes sent to the dispensary for examination. Of these, 8476 had venereal disease of some kind, 4428 suffering from syphilis. This gives no real idea of the number of clandestine prostitutes in the city, because the agents of public morals only interfere with a girl after absolute and repeated proofs of her guilt. I cannot believe in this law of regulation, because, in the first place, it recognizes, legalizes, and induces an undue familiarity with prostitution in a manner which cannot but be degrading to a community; and secondly, it is unjust. It legalizes the act of illicit intercourse; but condemns and imprisons for disease the natural consequence of that act. Furthermore, with two people equally attacked and equally a menace to the public health, it seizes and punishes only one."

Insects as Transmitters of Infection.—The transmission of anthrax-infection by flies has been recognized for many years (Montfils, 1776; Davaine and Raimbert, 1865). In the report of the U. S. Bureau of Animal Industry, p. 177, 1891-92, Smith and Kilborne showed by experiment and observation that "Texas cattle-fever in nature is transmitted from cattle which come from the permanently infected territory to cattle outside of this territory by the cattle-tick (*Boophilus bovis*). The infection is carried by the progeny of the ticks which matured on infected cattle, and is inoculated by them directly into the blood of susceptible cattle. Sick natives may be a source of infection (when ticks are present)."

Leidy³ believed the fly was responsible for the spread of hospital-gangrene in the Civil War.

G. H. F. Nuttall⁴ conducted a series of experiments with reference to the transmission of the plague-infection by means of the common house-fly. He concludes that flies can live several days after they have fed upon plague-infected material; and it cannot be denied that they may play a part in spreading the plague if they fall into food or discharge their excrement upon it. Many experiments have shown that living, infected flies, after confinement for 24 to 48 hours in a clean apparatus and without infected food, were full of virulent plague-bacilli. In the light of these experiments vigorous measures should be taken for the destruction of flies, especially in epidemics of the plague. Measures should also be taken to prevent them alighting upon infected dead bodies and excreta, and to protect all food from their access. Certain other insects—*e. g.*, ants—have the same power of spreading the

¹ Zeit. f. Hyg. u. Infectiouskr., Band xxvii., S. 117, 1898.

² Boston M. and S. Jour., June 2, 1898.

³ Circular No. 35, 2d series, p. 8, July 11, 1898, U. S. Dept. Agriculture.

⁴ Centrabl. f. Bakt., Parasit. u. Infek., Band xxii., Heft 4, 1897.

plague-infection. There can be little danger of infection from the bites of fleas or bedbugs. After inoculating many animals with the plague-bacillus and also from the results of experiments of others, Nuttall concludes that cats, rats, white rats and mice, common house- and field-mice, guinea-pigs, rabbits, pigs, horses, monkeys, dogs, sparrows, and a few species of wild animals, become infected with the plague by inoculation or by feeding with infected material. He also found that doves, some dogs, cattle, hedgehogs, otter, lizards, and frogs were immune.

In a later publication¹ Nuttall treats of the part stinging-insects take in spreading infection, bedbugs and fleas being the insects employed for experiments. These insects were conveyed immediately from animals which had died of disease to sound and healthy animals. Nevertheless, in not a single case did infection follow. By means of these culture- and inoculation-experiments, made with the contents of the infected bugs and fleas, and by microscopic examination, it was decidedly shown that the source of infection is destroyed in these insects, and that the death of the germs proceeds more rapidly in the bugs with high temperatures when the insects are most active and are digesting rapidly. Although it may be possible for bugs and fleas to transmit by means of their stings the virus of anthrax, plague, chicken-cholera, and mouse-septicemia, still, Nuttall's conclusions warrant the belief that such an occurrence is extremely rare. Consequently the assertion often made by various authors without sufficient scientific proof that these insects play an important part in spreading the plague, seems unjustifiable. If the finger-nails come in contact with the squeezed contents of infected bugs or fleas which shortly before have swallowed infected material, or should the fingers have come in contact with the excreta of these insects, then, by scratching the spot thus infected, inoculation may be effected. That no infection came from the sting of infected insects in Nuttall's experiments was probably due solely to the fact that the infectious virus sticking to the mouth of the insect was probably sucked or drawn away from the wound into the insect itself; as an entomologist remarked, "the insect takes more than it gives." See also article by P. R. Joly, in *Thèse de Bordeaux*, quoted in *Medical Review of Reviews*, Oct., 1898, on spread of malignant pustule, Egyptian ophthalmia, Delhi boil, tuberculosis, and plague by flies. Also article by P. L. Simond, in *Ann. de l'Inst. Pasteur*, xii., 1898, on spread of plague by rats. Also paper by Hankin, in *Centralblatt f. Bakteriologie*, Band xxii., 16, 17.

Statement of Koch² Relative to Mosquitoes as Transmitters of the Malarial Poison.—"I have arrived at no definite conclusion relative to the origin of tropical malaria in the human being. Everything is as yet hypothetical; but among the many possibilities two factors may be considered as transmitters of this disease. One is the transmission of the germ through drinking-water, and the other is through the medium of the mosquito. The more I deal with this disease the more I incline to the view that the latter is its principal and probably the only vehicle. Wherever we turn we find tropical malaria and mosquitoes together, at the same time and in the same place." The small island Chole, on the east coast of Africa, he found to be free from malaria, and was the only place where he could sleep without a mosquito-net. "There is no malaria in the mountains and there are no mosquitoes there." Koch lays down the two following rules for malarial climates: "1. Drink only boiled water. 2. Sleep under a tight-fitting mosquito-net. I say expressly,

¹ *Centralbl. f. Bakter. Parasit. u. Infek.*, Band xxiii., Heft 15, 1898.

² *Arbeit. a. d. Kaiserlich. Gesundheit.*, pp. 299-303.

a 'tight-fitting net,' since such nets are generally full of holes or badly fitted, and consequently useless."

Hospital for Consumptives at Paris.—A part of the large estate of the late Mme. Boucicault will be directed to the establishment of a hospital for the treatment of tuberculosis.¹ The hospital is only one of the many objects of charity for which Mme. Boucicault left money; but it is the most important. The buildings have cost, with furniture, about \$650,000, and a sum of \$1,500,000 was left for its maintenance, the interest of which will amount to about \$45,000 a year. Any expense not covered by the gift will be liquidated by the Assistance Publique, which, besides receiving money from the city, receives yearly large bequests from private charity. This institution, which bears her name, is upon the point of opening, in the charge of Maurice Letulle, who has had marked success in the treatment of tuberculosis at St. Antoine. The new hospital has an ideal situation in the comparatively open quarter of Paris known as Javel, which is on the south side of the Seine, opposite Auteuil. The building is isolated, even the 4 streets inclosing it being wide and little travelled. Although the building is large, there will be but 160 beds, as the great object is plenty of space and ventilation. Of these beds, only 32 will be devoted to consumptives at the beginning; but it is believed that the hospital will eventually become one for such cases only, and the buildings have been planned with that end in view. Sixteen beds are reserved for employés of the Bon Marche; otherwise the hospital will be absolutely free. The main improvements to be noted are in the condition relative to the housing of the consumptive patients. The two wards to be devoted to them exclusively from the start occupy separate pavilions. The wards themselves are glass-roofed galleries, the sides of which may be made entirely open. This is for the air-treatment, which is a method constantly growing in favor. The patients will practically eat, sleep, and live out of doors, without draughts and protected by the glass roof. Only in stormy and very cold weather will the galleries be closed. The flooring is of polished hard wood, the furniture of enamelled iron, and there is no curtain or drapery of any kind. The object is to be able to disinfect the entire apartment by means of steam and hot water. The mattresses are made of wood-fiber, sterilized and unflammable, and the system of spittoons is entirely new. The matter of instant sterilization of all discharges from the patients' mouths and throats is to be carefully looked after. Finally the clothing of patients, nurses, and servants is to be specially fashioned, and is to be kept constantly disinfected. The patients, also, are to be graded as to the stage of the disease in which they may be. Incurable patients are to be isolated in smaller rooms away from the wards.

DISINFECTION.

Further Investigation as to the Efficiency of Formaldehyd.—Abba and Rondelli,² of Turin, found that the more they approached in experimentation the conditions met with in actual practice the less satisfactory were the results. Anthrax-spores were readily destroyed in a small box, but not in a large room, when exposed to formaldehyd for 18 hours. Their general conclusions were as follows: 1. The higher the temperature and the drier the air of the room the more effective is the disinfecting power of formaldehyd. 2. Formaldehyd in a gaseous condition possesses in itself scarcely any

¹ Jour. Am. Med. Assoc., Dec. 25, 1897. See also "Hospitals for Tuberculosis," Schneider, Viertelj. f. off. Gesundheit., 690, 1898; "The Campaign Against Tuberculosis," Liebe, Ibid., 667, 1898.

² Zeit. f. Hyg., Band xxvii., Heft 1.

penetrative power. 3. It has no injurious effect on clothing, fur, paper, leather, photographs, india rubber, or metal goods; nor does it seriously affect the color of goods. 4. It fixes blood- and other stains; but only slightly when they are very old. In practice (*a*) the disinfection is more rapid and certain in warm weather, when the room is warm and dry. (*b*) If the room is not well ventilated after disinfecting it is impossible to stay in it until after the lapse of 24 hours. A wood floor retains the odor for several days. (*c*) It is almost impossible to disinfect rooms with formaldehyd without the escape of odor outside of the room. (*d*) Bed-clothing, wearing-apparel, etc., even if loosely arranged, are not sterilized upon the interior. (*e*) Thin clothes hung up openly are sterilized. (*f*) Clothing stained with blood, pus, and other matters should not be exposed to formaldehyd, since the stains become fixed. (*g*) Disinfection of the surface of furniture, walls, and floor, especially in crevices, cannot, under the most favorable circumstances, be relied on. (*h*) Disinfection by formaldehyd is more expensive and troublesome than with corrosive sublimate. The authors believe the combined use of corrosive sublimate and steam to be superior to formaldehyd, but think the latter is useful when the others cannot be used.

1. Proof¹ is wanting that formaldehyd forms an exception to the general rule that gases act feebly as disinfectants. Most of the formaldehyd disappears quickly in the air at ordinary temperatures. (These experiments were conducted at a temperature of about 44°–50° F.) 2. When using formaldehyd as a disinfectant of rooms and furniture care must be taken that the walls of the room are of a uniform temperature. The rooms to be disinfected, as well as the adjoining rooms, should not be heated. [For the purpose of disinfecting modern ships formaldehyd is of doubtful value.] 3. The efficiency of the disinfection may be increased if steam is evolved or introduced into the rooms, so that the objects to be disinfected are moist. 4. Extreme care in stopping all cracks is not necessary—at least at low temperatures. 5. With professional supervision disinfection of houses with formaldehyd may properly take the place of cleansing with bread (a common German method). 6. In treating pillows, mattresses, soiled linen, and clothing, the difficulty of disinfecting fatty substances and stains must be recognized. 7. The cubic contents of the room to be disinfected afford no definite indication as to the amount of formaldehyd necessary for disinfection. The area of the surfaces to be disinfected is of greater importance. Experiments to determine the necessary temperature and humidity of rooms to insure thorough disinfection were not made; especially to ascertain whether the amount of formaldehyd must be increased in rooms at a high temperature.

Abba and Rondelli² state that the disinfecting power of formaldehyd is greater in proportion to the temperature of the rooms in which it is used. In the summer months, in warm and dry rooms, the process is more rapid and certain. Ivanoff³ confirms the foregoing statement.

With regard to the penetrating power of the gas, Robinson⁴ says: You cannot depend on the certainty of the action of the gas through more than one thickness of cotton cloth. As regards woollens, test-objects have been frequently killed through one or two thicknesses of blanket in the ordinary time of exposure.

Abba and Rondelli⁵ state that formaldehyd in the gaseous condition possesses of itself almost no power of penetration.

¹ Hyg. Rundschau, Aug. 15, 1898.

² Zeit. f. Hyg., Band xxvii., S. 49, 1898.

³ Centralbl. f. Bakt., Parasit. u. Infek., 22, 50, 1897.

⁴ Rep. State Board of Health of Maine, p. 135, 1898.

⁵ Zeit. f. Hyg., Band xxvii., S. 49, 1898.

The observations of Gehrke,¹ Doty,² and Aronson confirm these statements.

Disinfection of Clothing.—Abba and Rondelli³ found that clothing made of light material, freely suspended, may be sterilized with formalin. Their observations are confirmed by those of Lehmann, Walter, and Rosenberg.

D. D. Brough,⁴ after a series of experiments with formaldehyd, says of it: "I believe we have in formaldehyd the best practical gaseous surface-disinfectant known. For dwelling-house disinfection it is unsurpassed. It is easy of application and does no injury to goods. It is not ideal, its use being limited to surface-disinfection. Its penetrative powers under ordinary conditions are so slight as to be almost valueless. Good results are best obtained by using a large body of gas and having the room as tightly sealed as possible. Length of exposure and the influence of temperature are secondary to the amount used. Under these conditions disinfection may be regarded as complete after the use of formaldehyd."

To be noticed also are the following: **Disinfection of rooms with formaldehyd by the use of the autoclave and Schering's lamp, "Æsculap,"** by Symanski;⁵ and **Disinfection of closed rooms by formaldehyd,** by Peerenboom.⁶

Disinfection of Books.⁷—"Books may be satisfactorily disinfected by means of formaldehyd gas in an ordinary steam-chamber. The books should be arranged to stand as widely open as possible upon perforated wire shelves, set about one or one and a half feet apart in the chamber. A chamber having a capacity of 200 to 250 cubic feet would thus afford accommodation for about 60 books at a time. Books cannot be satisfactorily disinfected by formaldehyd gas in houses or libraries, or anywhere except in special apparatus constructed for the purpose, because the conditions required for their disinfection cannot thus be complied with. The bindings, illustrations, and print of books are in no way affected by the action of formaldehyd gas."

INDUSTRIAL HYGIENE.

Prevention of Phosphorus-necrosis in Match-making.—Thomas Oliver was commissioned by the British government to visit France and report upon the subject of match-making.⁸ This industry is in France a State monopoly, and is the source of considerable revenue to the government, giving employment to 1340 people. Of this number, from 3% to 5% are generally ill, and cases of necrosis are of common occurrence. The dangerous processes are the mixing, dipping, and boxing. The boxing, when done by hand, causes more ill health than the other processes. Good ventilation and the consequent removal of the fumes of phosphorus are absolutely necessary; but there is a tendency to disregard these matters, and hence work is often conducted in a vitiated atmosphere. The following hygienic regulations are adopted: It is forbidden to take food or drink into the workshops. Those who wish to take a light meal are sent to a dining-room furnished for the purpose, after following these instructions: 1. To leave their working-clothes in the cloak-room.

¹ Deutsch. med. Woch., 24, 242, 1898.

² Zeit. f. Hyg., Band xxvii., S. 49, 1898.

³ Zeit. f. Hyg., Band xxviii., B. 2, S. 219, 1898.

⁴ Hyg. Rundschau, Heft 16, S. 769, Aug. 15, 1898.

⁵ "From Report on the Use of Formaldehyd as a Disinfectant," Dept. of Health of New York City, 1898.

⁶ Report of Visit of Inspection to French Match-works at Aubervilliers, Pantin, and Mar-seilles, London, July, 1898.

⁷ N. Y. Med. Jour., 66, 517, 1897.

⁸ Tr. Mass. Med. Soc., June 8, 1898.

2. To wash their hands with soft soap and water. 3. To gargle the mouth with a specified gargle.

Experiments are being made by the French government to make a match without phosphorus, and Oliver says, "to some extent the government has solved the problem of making a match free from white phosphorus and capable of striking anywhere. It has only been in existence since March, 1898, and is not yet an established industry." Oliver formulates the following conclusions: 1. Until recently the match-makers in French factories suffered severely from phosphorus-poisoning; at present there is apparently a reduction in the severe forms of illness. 2. The reduction in amount of illness is due to greater care in the selection of employés; raising their age at admission to work; medical examination on entrance; subsequent close supervision; repeated dental examination; personal cleanliness of workers; early suspension on appearance of symptoms of ill health; improved methods of manufacture. 3. The French government, aware of the danger in this occupation, is seeking new modes of manufacture, retaining expert chemists and inventors to make experiments. 4. The government has to some extent already succeeded in making matches capable of striking anywhere and free from white phosphorus. For a more complete paper on the subject of the manufacture of these matches without phosphorus, see article in *Rev. d'Hygiène*, Aug., 1898, p. 673. See also Twenty-seventh Annual Report of the French Consulting Committee of Hygiene (Melun, 1898, p. 300), which recommends the disuse of white phosphorus in the manufacture of matches, better ventilation of factories, short hours for operatives, frequent medical inspection, exclusion of operators having sore mouths, and careful supervision of lunch-rooms and lavatories.

Protective Glasses for Workshops.—Detourbe¹ describes, with illustrations, several forms of glasses for workmen, intended to protect the eyes and other parts of the face: 1. From fragments, more or less solid, cold or hot, which are often violently thrown off from the materials upon which the workman is employed. 2. Dust. 3. Dangerous liquids, vapor, and injurious gases. 4. The blinding heat and glare of certain objects of industry. These glasses or lunettes are made with metallic frames and glass lenses, and are fitted to the face of the wearer and secured by an elastic band around the head. They may also be combined with a respirator for the mouth and nose, and with colored glasses, if needed.

Lead-poisoning among Printers.—Fromm,² in this paper, considers the question whether the lead is inhaled as dust, absorbed by the skin in handling types, or swallowed while eating with unwashed hands. Stumpf showed that lead was present in the dust of printing-establishments; and the Austrian Factory Inspectors found 16.4% of lead in the dust of a type-case and smaller amounts in other parts of the room. In a recent report to the German Board of Health Faber gives the higher percentages he found in ledges, upon the walls of rooms, and on shelves. As high a percentage as 11.5 was found in the dust on a shelf 47 cm. (19 in.) above the floor.

Makers of Bottle-stoppers.—Marcuse³ states that 7 patients suffering from lead-poisoning presented themselves to a club-doctor in Berlin on the same day. All were employed in a factory for making bottle-stoppers. Before the operation of firing, a powder was used which filled the workroom with dust. This powder was found on analysis to contain 30% of lead acetate.

Hygiene of Laboring-classes.—Sanquisico⁴ states the following per-

¹ Report of Visit, etc., p. 627, July, 1898.

² Hyg. Rundschau, Band vii., Heft 10.

³ Tr. German Soc. of Pub. Health, Berlin, Heft 1, 1898.

⁴ Gior. della Reale Società Italiana d'Igiene, Heft 5, 1898.

centages of sick persons and average days of illness as gathered from the figures of the mutual insurance societies of Italy; the observations are derived from nearly 29,000 persons:

	Percentage of sick persons.	Average days of illness.
Agricultural laborers	38.8	9.1
Stonemasons	30.1	7.1
Artisans	28.8	7.5
Porters	33.2	9.1
Shoemakers	26.5	7.2
Compositors	21.9	7.5
Factory-hands	27.3	7.4

WATER-SUPPLY AND SEWAGE.

Typhoid Fever and Polluted Water-supplies.—In the Twenty-eighth Annual Report of the State Board of Health of Massachusetts, p. 779, appears the following statement relative to the effect of the introduction of public water-supplies upon the death-rate from typhoid fever:

Summary by Decades (Massachusetts), 1856-95.

PERIOD.	Death-rate from typhoid fever per 100,000.	Percentage of population not supplied with public water.	PERIOD.	Death-rate from typhoid fever per 100,000.	Percentage of population not supplied with public water.
1856-65	92.9	75.44	1876-85	47.4	31.75
1866-75	80.8	58.94	1886-95	36.4	13.93

The death-rate from this cause has generally fallen as the per cent. of the population supplied with public water has risen, for the reason that the majority of deaths from typhoid fever have occurred among communities and portions of communities not supplied with public water. See also the paper entitled "Water-borne Typhoid." A historic summary of local outbreaks of typhoid fever in Great Britain and Ireland, 1858-93. By Ernest Hart, D. C. L. London, 1897. This paper contains a tabular analysis and summary of 208 outbreaks of disease. Also, paper by John W. Hill, C. E., entitled "The Relation of Water to Typhoid Fever." Cincinnati, 1898.

Sewage.—Standards of Purity of Effluents.—The Fish-test.—S. Rideal¹ quotes Dibdin, who says: "He had long since adopted in his own mind a physiologic standard—viz., that the quality of an effluent should be such that fish could live healthily in it. . . . Such a definition involves necessarily the absence of poisons and the presence of oxygen." But while an effluent which kills fish is obviously unhealthy, it does not follow that one where fish will live is therefore a good one. It is well known that fresh-water fish are gross feeders, and fish in large numbers are often seen to congregate at the mouths of sewers where fecal matter is visibly floating, being attracted by the fragments of food and insects carried down by the sewage. Fish, in fact, are more affected by muddy water and by chemicals from factories than by excreta.

Treatment of the Sewage of Manufactories.—It often happens that the sewage produced in certain industries requires more care in treatment than the ordinary household sewage of towns. H. M. Wilson² specifies the

¹ Sanitary Rec., p. 323, Sept. 23, 1898.

² Jour. Sanitary Inst., p. 17, Apr., 1898.

following trade-liquids as requiring special treatment: 1. The suds from mills in the wool and silk trades, and especially from the process of wool-washing. 2. The discharges from certain classes of mills in the wool trade, which contain much fibrous waste. 3. The waste from tanneries. 4. The waste from breweries. 5. The waste from paper-mills.

Arsenic in Sewage.—The sewage of certain industries contains arsenic in sufficient amount to prevent the growth of bacteria, and consequently to hinder those useful processes which depend upon bacterial action. The Massachusetts Board of Health found by experiment¹ that the arsenic could be completely removed by passing the sewage through a filter of coke-breeze. Iron filings or trimmings produced the same result. Analyses of the coke in the filter showed that a large percentage of the arsenic is retained in the upper few inches of the filter.

River-pollution Standards.—In 1870 the British River-Pollution Commission suggested certain standards, which were framed with due regard to the extent to which the cleansing of foul liquids can be effected without imposing undue restrictions upon the manufacturer, and without "serious injury to such processes and manufactures" as are conducted in the river-basins under examination. In further discussion of this question, Hans Benedikt (Stuttgart, 1896) says: "From the standpoint of public hygiene it is requisite that the government officials, in enforcing the regulations for the prevention of an injurious degree of pollution of the public watercourses, observe the following principles: 1. Injurious pollutions of public watercourses are caused by (*a*) infectious matter, (*b*) putrescible matter, (*c*) poisonous matter, and (*d*) other matter which restricts the use of the water of rivers for domestic purposes, in agriculture, or in industry, or which endangers the fishing-industry. 2. With regard to the effluents included under (*a*) and those from industrial works which do not fall under (*d*), but contain putrescible substances, care has to be taken that such are discharged into public watercourses only in a completely clarified state, and are so diluted by the latter that malodorous putrefaction cannot set in later. 3. Poisonous matters, according to the present experience, only come into the question as mineral poisons (arsenic and lead in factory effluents). Very small quantities are innocuous. It is to be taken into consideration that the limit within which the discharge of such matter into public watercourses is permissible is fixed by experts. 4. Watercourses may also be polluted by other matters than those included under 1 to 3, rendering them unfit for drinking-purposes, for domestic uses, for industry, for agriculture, or endangering fishing. This is especially the case with regard to the effluents from dye-works, soda-, gas-, and other chemical works, the effluents from paraffin- or petroleum-works, hot condensation-water, chemicals which have served for clarification and disinfection of effluents, etc."²

Engineer Hering's Statement Relative to Bacterial Sewage-purification.—While admitting that the Exeter and Sutton experiments are not only interesting, but promise to improve the present methods of sewage-disposal where suitable land for slow filtration is not available, he considers it judicious to remark that the improvement may not be so great as the promoters anticipate. The following passage³ is worth quoting: "It appears that with a limited amount of land permanent success in purifying sewage can be accomplished only by a prior separation of the suspended and dissolved organic matter. Organic matter in solution can be thoroughly purified by aerobic

¹ Senate Document, No. 4, p. 79, 1897.

² For further experiments of the effect of soda-waste upon the life of animalcule and plants, see Jour. Sanitary Inst., p. 31, Apr., 1898.

³ Engineering Mag., Sept., 1898.

bacteria, and in large quantities per acre in properly devised filters of sand, coke-breeze, or similar porous and permanent material, operated intermittently. Undoubtedly, also, some fine fibrous or globular nitrogenous matter may also be removed by this relatively rapid process; but the organic matter in suspension requires a preliminary separate treatment, either, first, by a system of chemical precipitation; or, secondly, by a system of liquefaction as accomplished in the septic tank, by which the quantity of sludge is at least very greatly reduced; or, thirdly, by a preliminary very fine screening, with a subsequent liquefaction of the remaining suspended matter in a so-called bacteria-tank. Whether the first, second, or third method will prevail in the future depends largely on the question of cost of obtaining satisfactory results, which may be ascertained from the experience now being gained."

The Conveyance of Bacteria by Underground Water.—E. Pfuhl¹ says that the importance of ascertaining whether it is possible for water situated deep in the soil to become contaminated by bacteria penetrating downward from the surface had long been recognized, and these investigations were undertaken in order to set this question at rest. The experiments were conducted in a gravel-soil, in a clearing of the forests bordering the Rhine, adjacent to the Strasburg waterworks. Two pits were excavated, one to a depth of 1 meter (3.28 feet), in which the subsoil-water stood at a level of 50 cm. below the surface; and the other 8 meters distant from it and perpendicular to the direction of the flow of underground water. This second trench was $1\frac{1}{2}$ meters deep, 1 meter wide, and 12 meters long. Two species of bacteria, which do not occur in Rhine water, were selected for the experiments—namely, cultivation of the **Micrococcus prodigiosus** and of the fluorescent **vibrio**; these latter did not lose their shining properties by immersion in the water, and are strongly recommended by the author for investigations of this nature. With all necessary precautions, which are set forth in detail, bouillon-cultures of these bacilli were introduced into the first pit, and at intervals of about half an hour samples were withdrawn from the second pit lower down and cultivated in the usual way on gelatin or on agar plates. It was ascertained that in one hour the micrococci, and in two hours the vibrios, had passed through the 8 meters of intervening gravel which separated the two pits. In further experiments, which are fully described, the **prodigiosus** bacilli were found to pass into the supply of a tube-well drawing its water through gravel from a distance of 3.7 meters from the point where the cultures of bacteria were inserted into the water near the surface.

The So-called Septic-tank System of Sewage-disposal.—H. W. Clark, Chemist to the Massachusetts State Board of Health, states the following opinions relative to the use of the septic tank for sewage-disposal purposes:² In conclusion, it can be said that the septic-tank process is one of much interest to any one studying sewage-purification; but there are two drawbacks: First, the fact that a large body of septic sewage must be exceedingly offensive and cause a nuisance where the same volume of fresher sewage would not cause a nuisance; and second, the construction of a reservoir of sufficient storage-capacity to hold a large volume of sewage—that is, one day's flow from a municipality of average size—would be quite an expense. It seems probable, however, that a much smaller tank can be used in proportion to the volume of sewage flowing than is used at Exeter, and for this reason: A sewage of ordinary age—that is, one that has travelled for any great distance in the sewers—will, when it reaches its place of disposal, be practically free from dissolved oxygen, all having been used up by the bacteria and organic matter before

¹ Zeit. f. Hyg., S. 549, 1897.

² Engineering News, p. 77, Aug. 4, 1898.

reaching this point. Now, if such sewage runs into a properly built septic tank no air will be carried in with it, and the length of time which it remains within the tank need be only long enough to allow a complete precipitation of the insoluble matters and the accumulation, to some extent, of the fats upon the surface of the sewage. These matters may remain in the tank for an indefinite time; and, being acted upon by the bacteria of decomposition and putrefaction, will be slowly changed to the soluble form, and pass away to a large extent, perhaps, in the effluent of the tank. Thus, the sludge, the difficult factor in sewage-purification, may perhaps be disposed of, and the sewage, staying a shorter time within the tank, will not have such an offensive odor and will not make the disposal-area so great a nuisance. The process has not been on trial long enough as yet, however, to determine accurately what percentage of the total volume of sludge can be gotten rid of in this way.

FOOD- AND DRUG-INSPECTION.

Sale of Meat and Milk from Tuberculous Cattle.—The report of the Royal Commission upon the “administrative procedures for controlling danger to man through the use as food of the meat and milk of tuberculous animals” was presented to Parliament April 19, 1898. Its recommendations deal with the following topics: 1. The regulation of slaughter-houses. 2. The qualifications of meat-inspectors. 3. Tuberculosis in animals intended for food (what carcasses or portions of carcasses should be condemned). 4. Milk (diseases in the udders of cows). 5. Sanitary regulations of cow-stables. 6. The elimination of bovine tuberculosis and the use of tuberculin.

Meat-poisoning.—F. Basenau¹ says most cases of meat-poisoning are traceable to the flesh of animals that have been killed *in extremis*. A particular class of diseases in slaughtered animals is also apt to render the flesh injurious to the consumers' health. Such are polyarthritis septica of calves, hemorrhagic enteritis of calves, septic metritis of cows, and certain intestinal affections of oxen. The following figures show the greater proportion of cases of injurious meat obtained from animals slaughtered *in extremis*, as compared with those killed in the ordinary way in Baden:

	Out of 1000 slaughtered in the ordinary way.	Out of 1000 slaughtered <i>in extremis</i> .
Cattle	1.6 cases.	128 cases.
Calves	0.4 case.	4.9 “
Sheep	0.2 “	20.2 “
Pigs	0.3 “	63.4 “

Poisoning by Canned Food.—J. Brown² contributes a paper on canned-food poisoning, in which he states at the outset that such cases are of rare occurrence, considering the amount of such food now in use. He states the daily consumption of canned foods in England as 581,000 pounds. Canned salmon is eaten by 2,000,000 people daily. One firm in Liverpool sells 20,000,000 cans per year. American exports of canned beef amount to nearly 61,000,000 pounds a year. Brown cites 14 instances of canned-meat poisoning, gathered from medical journals (not from newspapers) during a period of 17 years (1879–95). The number of persons recorded was about 65, and included 6 deaths. In addition to these there were 8 instances of poisoning from canned fish, including about 20 persons, with 6 deaths; also 3 instances of poisoning from eating canned fruits (tomatoes and cherries), but no deaths. Metallic salts were found in canned fruits (tin, zinc, and lead). Canned food 20 to 30

¹ Arch. f. Hyg., Band xxxii., Heft 3.

² Jour. Sanitary Inst., p. 59, Apr., 1898.

years old has been used without harm. The author suggests aluminum as a substitute for tin, and believes: (1) The government should forbid the importation of canned goods in which the tin-plate contains more than 1% of lead, or more than 10% in the solder; such a law has been in force in Germany since 1889. (2) The soldering should be on the outside of the can. (3) The date of canning should be stamped on each can.

Diseases of Food-animals.—The Director of the Leipsic Abattoir presents many important facts in his annual report for 1897 relative to the results of the inspection of slaughtered animals used as food. The whole number of animals (cattle, calves, sheep, goats, pigs, and horses) slaughtered during the year was 278,551. Of these, 412 were totally condemned; 360 were allowed to be sold in the raw state, as of second quality; 1708 were allowed to be sold when cooked or sterilized. In the case of 294 pigs slaughtered (out of 132,062 in all) only the fat was melted and sold. The diseases for which the animals were condemned were chiefly tuberculosis, swine-fever, pyæmia, jaundice, inflammation of stomach and intestines. There were also 6 cases of cysticercus and 3 of trichina in the pigs. The condemned animals constituted only a small part of the tuberculous. Among the cattle, 36.4% were found to be tuberculous; and of the cows, 48.1%; but only 2.1% of all cattle were condemned, including 2.5% of the cows.

Existence of Tubercle-bacilli in Butter.—L. Rabinowitsch¹ reviews this question, and shows considerable variability in opinion upon the subject. Galtier made cheese from milk in which he had mixed tuberculous matter, and inoculations with this cheese caused tuberculosis. Heim mixed tuberculous bacilli with butter, and found that inoculation of this butter produced tuberculosis as late as 30 days afterward. Gasperini found that the bacilli remained active for 123 days. Bang proved that butter made from milk of cows having advanced mammary tuberculosis is infectious. The following experimenters inoculated guinea-pigs with butter bought in the markets, with results as stated: Brusaferro produced tuberculosis in 1 specimen out of 9; Roth, in 2 out of 20; Schuchardt, in 1 out of 42; Gröning, in 8 out of 17; Obermüller, in 14 out of 14. Rabinowitsch made inoculations representing 80 specimens of butter obtained in Berlin and in Philadelphia. The inoculations of guinea-pigs amounted to 119. In none of these cases was satisfactory evidence obtained of genuine tuberculosis. But in 23 specimens lesions were caused in guinea-pigs, which both macroscopically and microscopically appeared like genuine tuberculosis, but could be distinguished from it on close analysis. The author admits that the dangers of transmitting tuberculosis through the medium of cheap butter are not serious, and the positive results obtained by other experimenters admit of the same explanation. The inquiry appears to have been suggested and investigated by Koch himself.

Cider as a Culture-medium for Disease-germs.—Vigot,² of Caen, has investigated the question whether the typhoid bacillus and the colon-bacillus can survive and continue to be pathogenic in cider taken from the press before fermentation. This question arose in consequence of a custom, prevalent in Normandy, of using very filthy water under the pretext of giving a better taste to cider. Neither the typhoid nor the colon-bacillus would grow in pure cider or cider diluted with distilled water, and inoculations of animals were, except in one instance, harmless. The author discusses the cause of this circumstance, and concludes that it is not the acidity, but the fermentation, which hinders the growth of the bacilli, and that when the bacillus is found

¹ Zeit. f. Hyg. u. Infectiouskr., Band xxvi., S. 90, 1897.

² Tribune méd., p. 648, Aug. 18, 1897.

the cider has been diluted with the water containing the bacillus after fermentation has occurred. Hence there may be a danger here which has been overlooked in localities where dilution of cider with filthy water is a common custom.

Food Preservatives.—The *Lancet*, Aug. 27, 1898, says: "We think the use in limited quantities of such mild antiseptics as **borax** to be justified at a time like the present, when otherwise a considerable amount of valuable food-substances would be wasted and lost. But, as we have urged before, the fact of an article being thus preserved against change should always be notified to the consumer, and we would have limits imposed by the State as to the amount of the preservative to be used; moreover, the nature of the preservative should also be declared. In other words, we would establish a system, recognized by the State, by which under certain circumstances the employment of preservatives, with restrictions as to their nature and amount, could be legalized." See also papers by Alfred Hill,¹ Medical Officer of Health of Birmingham, England, who objects to the use of chemical preservatives, and advises refrigeration instead.

Papers Used as Wrappers for Food-preparations.—The Comité Consultatif d'Hygiène of France² has made an examination of papers used in France for wrapping food, such as newspapers, circulars, leaves of large books, and commercial registers, and finds many of them extremely dirty. The committee concludes that: 1. Old newspapers, printed prospectuses, leaves of books, ought not to be used as wrappers of food either dry or moist. 2. That old registers and commercial papers may be allowed for wrapping dry food under strict conditions, occasional examinations of such papers being made. 3. That white paper only, without artificial coloring, and neither printed nor written upon, should be used for wrapping moist food-material. [These regulations could scarcely apply to American conditions, where excellent Manila wrapping-paper fresh from the mill is almost universally used for wrappers and for paper bags. The process of manufacture, in which lime is largely used, is in itself a disinfecting process.]

SCHOOL HYGIENE.

Air-humidity in School-rooms.—S. H. Woodbridge³ says: "For each pint of water evaporated at low temperatures 1000 heat-units must disappear in the process. To give an out-door June humidity to 1,000,000 cubic feet of air warmed through the average range of temperature required for winter-ventilation would make necessary the evaporation of 400 pounds of water and the burning of some 50 pounds of coal. The warming of that quantity of air through the average range of 35° F. of temperature would require the burning of 75 pounds of coal. The cost of moistening air to that degree through the school-year would therefore range from one-half to two-thirds of the cost of warming it. The comforting assurance indulged in by some persons that the perspired moisture given to the air of well-filled rooms sufficiently satisfies hygienic demands, overlooks both the quality of that moisture as dermal sewage and also its quantity, which is but little more than one-tenth of the assumed standard requirement. The delightful and invigorating character of ideal June conditions of the atmosphere cannot be questioned. It by no means follows, however, that such conditions artificially maintained would be either healthful or satisfactory. The more moist the air the larger

¹ Sanitary Rec., 1898.

² Twenty-seventh Annual Report, Melun, 1898.

³ Connecticut School Document, No. 13, p. 27, 1898.

the quantity needed both for comfort and for health. With outside air at 70° F. and at normal moisture the supply of 2400 cubic feet of air, which is generous in winter weather, would be intolerably meager. Such humidity to be endurable demands the open windows and the out-of-door abundance of air that belong to June."

Cubic Air-space Per Capita in Public Schools.—The requirements in different countries and cities are as follows:¹ England, new schools, 140 cubic feet; old schools, 96–112. Belgium, 160. Holland, 160. Bavaria, 137 for scholars of 8 years; 197 for those of 12 years. Dresden, 154. Basle, 148–164. Sweden, 188–352.

Heating and Ventilation of School-houses.—Considerable doubt has been raised as to the efficiency of systems of heating and ventilation, which include the methods of disposal of excreta, especially in the warm season, when the general heating-apparatus is not in operation and other fires are apt to be neglected. The following quotation² has a direct bearing on this subject: "The sole dependence of the system, therefore, lies in a continuous current of air from the rooms, through the closets, and up the vent-shaft. The natural flow must, of course, be in this direction, the aspirating power of the vent-shaft being depended upon to furnish the motive power. If by any chance the fire in the stack-heater goes out, then there is liable to be a reversal of the current. In only one instance, however, did I find the fire out in the stack-heater, due evidently to carelessness on the part of the janitor. In general, I found good fires in the stack-heaters, so that whatever defects were found in the system could hardly be attributed to this source. To my mind the most serious defect seems to have been the attempt to combine at all this system with that of heating and ventilating, systems which are diametrically opposed to each other and which have no connection between them. Why should we be constantly running the danger of a backward draught; and why should teachers and pupils be constantly blockaded behind closed doors and windows when there is no necessity; and why should the atmosphere be poisoned and the soil polluted merely for the sake of retaining excreta upon the premises? With this part of the system removed, back draughts lose part of their terror."

The danger of spreading infectious diseases through the public schools, by Schäfer;³ and **The medical inspection of schools,** by Kollé, of Wiesbaden,⁴ are noteworthy articles.

The Vital Statistics of School-life.—In his address as President of the Sanitary Association of Scotland, at its annual meeting, Sept. 7, 1898, A. K. Chalmers,⁵ of Glasgow, states that a great improvement has been effected in the health of school-children in the past 20 years. This decrease in the death-rate of persons from 5 to 15 years of age amounted to about 38% in the 20 years. In other words, there was an annual saving of 2696 lives out of every million children of school-age in Scotland, a result which he attributes to the spread of enlightened sanitary ideas among educational authorities.

Pediculosis in Public Schools.—E. M. Greene⁶ reports that an examination of the children in the Boston public schools by the medical inspectors revealed the fact that a very large number of the children (as high as 74% in a grammar school of over 700 scholars) were affected with pediculosis. In each case recommendation was made to the parents that their heads be treated with petroleum, to be followed by a bath of soap and water. Re-

¹ Public Health, p. 192, Mar., 1898.

² Rep. Health Officer of the District of Columbia, p. 68, 1897.

³ Viertelj. f. off. Gesundheit., Band xxx., B. 4, 617, 1898.

⁴ Ibid., 3, 433, 1898.

⁵ Sanitary Rec., p. 299, Sept. 16, 1898.

⁶ Boston M. and S. Jour., Jan. 20, 1898.

examination showed a large number still infected. They were then excluded from school until recovery.

THE HYGIENE OF INFANTS.

Nursing-bottles.—In its last annual report¹ the General Health Board of France recommends that: 1. The local authorities should forbid the use of nursing-bottles having long tubes attached. 2. That a nurse who uses such bottles shall not be entitled to pay. 3. That the local authorities should distribute gratuitously to indigent nurses bottles that can be easily cleaned and are without tubes. 4. That the local authorities should exercise a vigorous supervision over the articles employed for artificial feeding of infants, with reference to having them kept in a uniform condition of cleanliness.

Other articles on the subject are: **Mortality and morbidity in infant-asylums, and their causes**, by Finkelstein;² and **The causes of mortality among infants in their first year of life, and the measures for preventing it**, by E. Barthés.³

MISCELLANEOUS.

Wood Pavements from a Sanitary Aspect.—C. Mason⁴ states the following objections to wood pavements, for sanitary reasons: 1. Too little attention has been given in the past to the contour of the road to allow for a natural fall to the gullies. 2. The wood used has in many cases not been carefully selected and properly treated with a preservative. 3. The expansion-joint in each channel is allowed to become a source of nuisance. 4. Repairs have not been carefully executed, and renewals have not been made at frequent intervals. 5. An inefficient system of scavenging has been permitted. The following are the essentials of a satisfactory wood pavement: 1. A properly constructed roadway. 2. Careful maintenance and frequent renewals. 3. Good scavenging.

Fatal Case of Lead-poisoning.⁵—A supply of water for a private house was taken from a spring by means of a lead pipe attached to a pump about 175 feet distant. The plumber who laid the pipe allowed a considerable amount of lead filings to remain at the joints, which were soldered in the usual manner. Soon after the work was completed a young woman at the house was taken ill, and the father and mother suffered severely from colic. The girl died; lead-poisoning was suspected, and a government investigation was made. The autopsy demonstrated lead in several organs; and the water, which was exceedingly pure, was found to have dissolved 0.95 mgm. per liter. The hardness was only 1.4.

VITAL STATISTICS.

The condensed advance sheet of the Registrar-General's Report, showing the **marriages and births and deaths in England** in 1897, has been issued, and differs but little from the full returns published a year later. The estimated population of England and Wales at the middle of the year (1897)

¹ Comité Consultatif. d'Hyg. pub. de France, Melun, p. 17, 1898.

² Zeit. f. Hyg., 28, 125, 1898.

³ Rev. d'Hyg., p. 641, July, 1898. See also the excellent prize essay by Jones, of Liverpool, Jour. Roy. Statistical Soc., London, vol. lvii., entitled "The Perils and Protection of Infant-life;" also, city ordinances of Department of Health of Buffalo, Aug. 1, 1897, § 81, p. 47, relative to sale of feeding-bottles with rubber tubes.

⁴ Jour. Sanitary Inst., p. 95, Apr., 1898.

⁵ Gesundheit-Ingenieur, p. 87, Mar. 31, 1897.

was 31,055,355. The marriages, births, deaths, and the rates were as follows:

	Number.	Rate per 1000 living.
Marriages	248,843	8.01
Births	921,254	29.67
Deaths	541,428	17.43

The births of males to those of females were as 1037 to 1000. The death-rate of males was 18.62, and that of females was 16.31. The marriage-rate of London in the same year was 9.23; birth-rate, 29.71; death-rate, 17.80.

The Society for the Promotion of the **Increase of Population in France**, established in 1896, publishes the following figures,¹ which show not only the changes in the birth- and death-rates of different countries in a period of 30 years, but also the excess of births over deaths, which is a significant figure, since a flourishing nation usually presents a marked difference between its birth-rate and death-rate; in this excess or difference lies the natural growth of the population:

Growth of Population in Different Countries.

Country.	Period.	Birth-rate for 1000.	Death-rate for 1000.	Excess of births over deaths.
		(Stillbirths excluded.)		
German Empire	{ 1864	37.8	26.2	11.6
	{ 1894	35.9	22.3	13.6
England and Wales	{ 1864	35.4	23.7	11.7
	{ 1894	29.6	16.6	13.0
Austria	{ 1864	40.3	30.0	10.3
	{ 1894	36.7	27.8	8.9
Belgium	{ 1864	31.5	23.5	8.0
	{ 1894	29.0	18.6	10.4
Denmark	{ 1864	30.3	23.3	7.0
	{ 1894	30.2	17.5	12.7
Scotland	{ 1864	35.6	23.6	12.0
	{ 1894	30.1	17.2	12.9
Spain	{ 1864	38.9	30.9	8.0
	{ 1892	36.1	30.9	5.2
France ²	{ 1864	26.6	22.7	3.9
	{ 1894	22.4	21.2	1.2
Holland	{ 1864	35.7	25.3	10.4
	{ 1894	32.7	18.5	14.2
Hungary	{ 1865	41.8	30.2	11.6
	{ 1894	41.3	30.4	10.9
Ireland	{ 1864	24.0	16.4	7.6
	{ 1894	22.9	18.2	4.7
Italy	{ 1866	39.0	29.2	9.8
	{ 1894	35.7	25.1	10.6
Norway	{ 1864	31.1	17.7	13.4
	{ 1894	29.7	16.9	12.8
Russia and Poland.	{ 1865	49.7	35.6	14.1
	{ 1897	45.5	40.0	5.5
Switzerland	{ 1871	29.0	27.6	1.4
	{ 1894	28.2	20.7	7.5
Massachusetts	{ 1856-1865	27.4	19.4	8.0
	{ 1886-1895	26.8	19.6	7.2
Rhode Island	{ 1854-1863	20.9	13.9	7.0
	{ 1891-1895	25.3	19.4	5.9
Connecticut	{ 1857-1861	25.1	15.2	9.9
	{ 1891-1895	24.1	18.4	5.7
Vermont	{ 1857-1861	20.3	17.6	2.7
	{ 1891-1895	20.4	17.0	3.4

¹ Rev. d'Hyg., p. 383, Apr., 1898.

² In 1890, 1892, and 1895 there was a slight excess of deaths over births in France.

Vital Statistics of the City of Paris for 1897.¹—Estimated population, 2,529,405.

Births,	59,355 ;	birth-rate,	23.5 per 1000.	
Marriages,	25,115 ;	marriage-rate,	9.9 " (persons married, 19.8).	
Deaths,	46,804 ;	death-rate,	18.5 "	

Deaths by Ages.

Under 1 year	6,383
1 to 19 years	6,714
20 to 39 "	9,177
40 to 59 "	11,440
60 years and over	13,090
Total	46,804

Principal Causes of Death.

Smallpox	12	Apoplexy	2227
Measles	823	Bronchitis and pneumonia	5590
Scarlet fever	59	Heart-diseases	3112
Diphtheria and croup	291	Diarrheal diseases	2904
Typhoid fever	241	Accidents	950
Puerperal fever	255	Suicides	876
Phthisis pulmonalis	9250	Other causes	19,146
Other tuberculous diseases	1068	Total	46,804

The Effect of Climate upon Tuberculosis.—By comparing the monthly mortality from tuberculosis in countries in north and south latitudes the effect of seasons upon the mortality from consumption is shown to a remarkable degree. In the following table this comparison is made possible by reducing the mortality to a centesimal standard or ratio, by which it appears that the mortality in the spring months in north latitudes is nearly complementary with that of the same months in south latitudes. The figures are taken from the *Report of the Massachusetts State Board of Health for 1896*, and from the *Anales del Departamento Nacional de Hygiene*, Buenos Aires, vol. viii., No. 14, Sept., 1898, p. 568.

Decrease of Tuberculosis in Europe.—Rahts² presents a general summary of the statistics of mortality from consumption in the German Kingdom. The following figures represent deaths per million of the population, and show a decrease from 1880 to 1895 in nearly every country :

	1880-86.	1887-93.	1894.	1895.
Prussia	3112	2715	2389	2326
Bavaria	3067	3180	2894	2814
Saxony	2468	2240	2137	2097
Austria	3902	3682		
Hungary	2960	3008		
Switzerland	2101	2065	2069	
Italy		1340	1304	1342
England	1803	1568	1385	1403
Scotland	2107	1794	1723	
Belgium		1764	1576	
Netherlands	2001	1918	1931	

In the large cities of

Germany	3436	2896	2553	2492
Italy	2334	2033	1869	
France		2823	2652	
Denmark	2419	2379	2065	

¹ Jour. d'Hyg., Mar. 10, 1898.

² Arbeit. a. d. Kaiserlich. Gesundheit., Band xiv., Heft 3, 1898.

PHYSIOLOGIC CHEMISTRY.

BY JOHN J. ABEL, M. D.,

OF BALTIMORE, MD.

Chemistry of the Diphtheria-antitoxin.—Brieger and Boer's¹ investigations, showing that the antitoxic principle was precipitated by numerous agents, suggested that they did not precipitate the antitoxic body directly, but that it was firmly united to some body which on precipitation carried it down with it. Smirnow claimed that serum-globulin neutralized the diphtheria-toxin; but Diendonne's² studies showed that this neutralizing action varied with the method of isolating the globulin; and that the antitoxic body was not a globulin or an albumin, but an unknown body associated with the globulins. Belfanti and Carbone³ review the literature, and in a detailed article state that the antitoxic power is inseparably associated with the globulins of the serum, and that in its gross characters the antidiphtheric globulin is not distinguishable from that of normal serum. Kondratieff⁴ believes it related to the enzymes; while Brodie's⁵ experiments point to a proteid nature. The recent work of von Szontagh and Wellmann⁶ shows that the antitoxic body is not a nuclealbumin; that during immunization the albumins of the serum suffer no important modification; but that there is somewhat more albumin in the antitoxic than in the normal serum; and that the nitrogenous bodies are quantitatively unchanged. The specific gravity and ash-contents remain about the same in both, although the chlorin is diminished in the antitoxic serum. The freezing-point of the antidiphtheric serum is somewhat lowered and the electric conductivity is diminished, so that this diminution of electric conductivity may be used as a practical index of its antitoxic powers.

Action of Antiseptics on Toxins.—Antiseptics, as carbolic acid, formalin, salicylaldehyd, etc., not only act upon bacteria, but at body-temperature diminish the toxicity of the diphtheria-toxin. Salkowski⁷ and Ehrlich⁸ and Brieger⁹ have shown that sulphuretted hydrogen destroys the toxicity of the tetanus-toxin. This diminution of the toxicity of toxins by antiseptics may possibly explain the action of salicylic acid in rheumatism or of mercury in syphilis. As is known, during the putrefaction of albuminous bodies antiseptics are formed, so in the intestinal tract one of the effects of putrefaction may be to neutralize any toxin present. Antiseptics, however, do not seem to injure the action of antitoxins.

Sugar in Normal and Diabetic Blood.—Kolisch¹⁰ finds, in agreement with Henriquez, that normal blood contains only minimal amounts of

¹ Zeit. f. Hyg., Band xxi., S. 259, 1896.

² Arbeit. a. d. Kaiserlich. Gesundheit., Band xiii., Heft 2; from Centralbl. f. Bakt., Band xxi., S. 369, 1897.

³ Arch. per le Sci. méd., vol. xxii., p. 9, 1898.

⁴ Centralbl. f. Bakt., Band xxi., S. 407, 1897.

⁵ Jour. of Path., vol. iv., p. 460.

⁶ Berlin. klin. Woch., S. 545, 1898.

⁷ Zeit. f. Hyg., Band xix., S. 111, 1893.

⁸ Deutsch. med. Woch., S. 421, 1898.

⁹ Klin. Jahrb., Band vi., S. 18.

¹⁰ Wien. klin. Woch., Heft 50, 1897.

preformed or free sugar. In diabetes the blood contains no more free sugar than normal blood, but a greatly increased amount of jecorin,¹ a complex substance discovered by E. Drechsel, and containing both phosphorus and sulphur, and which readily yields dextrose on boiling with dilute acids or alkalis. Kolisch holds that jecorin is not present as such in the blood, but is probably united with a proteid, just as hematin is combined with globin to form hemoglobin. Only in cases of alimentary glycosuria is the amount of free sugar in the blood increased.

Can the Sugar-content of Normal Urine be Influenced by Varied Diets?—Normal urine contains from 0.027% to 0.178% of grape-sugar.² While prolonged increased carbohydrate-diet causes no increase of sugar-elimination, yet considerable variation occurs during the day, depending upon the food taken, for after an abstinence from food for 23 hours a meal rich in starch may cause a marked increase, amounting to 0.203%. Other factors, as muscular work and increased heat-elimination, which increase the use of the body-sugar, may diminish its output.

Behavior of the Various Sugars in the Organism.—Strauss,³ by administering 100 gm. of grape-sugar, galactose, saccharose, lactose, or levulose to persons disposed to alimentary glycosuria, finds that the different kinds of sugars are eliminated by man in the same form as they had been taken per os—galactose as galactose, levulose as levulose, starch as dextrose, and saccharose mainly as grape-sugar. The monosaccharids, if they reach the circulation, are well worked up by the body—galactose least and levulose the best. In the case of the disaccharids, their splitting up in the digestive tract must be considered. While there is more opposition to the splitting of milk-sugar in the digestive tract than in the case of cane-sugar, yet Strauss is convinced that the gastric juice and the contents of the small intestine can both split it, and that the splitting and absorption of double sugars and polysaccharids are functions of the digestive canal. The sugars which undergo alcoholic fermentation, as dextrose, levulose, and galactose (after subcutaneous administration only), pass with difficulty into the urine (Voit⁴). Sorbinose, which resists alcoholic fermentation, also appears in the urine in small quantities. The pentoses, as arabinose, xylose, and rhamnose, however, appear in considerable quantities—52% to 86%; while of the disaccharids, cane-sugar, after its subcutaneous use, is almost entirely eliminated by the urine, but if given per os very little appears, as it must first be inverted by the small intestine. Milk-sugar behaves similarly; and Voit claims it must first be hydrolyzed in the small intestine before it can be absorbed. Maltose is not eliminated, being completely decomposed; and trehalose is eliminated by the urine in from 15% to 17%. Of the polysaccharids, glycogen was entirely used up by the body. Part of the erythrodextrin and amylo-dextrin disappeared, and a small portion was eliminated as achroödextrin. The portion of the dextrin which disappeared was split into grape-sugar and so used. There is a relation between the behavior of the sugar and its fermentative power.

Alimentary Glycosuria.—Krehl⁵ studied the urine of 100 students to see if there was any relation between beer-drinking and glycosuria. He found that, aside from the special kind of beer, individual peculiarities played an important part, glycosuria in some cases appearing after the ingestion of only small quantities, while others required much larger amounts. The condition

¹ Jour. f. prakt. Chem., Band xxxiii., S. 425.

² Arch. f. exper. Path., Band xl., S. 1, 1898. ³ Berlin. klin. Woch., S. 398 and 420, 1898.

⁴ Deut. Arch. f. klin. Med., Band lviii., S. 523, 1897.

⁵ Centralbl. f. innere Med., S. 1033, 1897.

of the digestive tract also was important, as glycosuria was especially marked after drinking on an empty stomach. This glycosuria is probably not due to the injurious action of the alcohol upon the liver,¹ as Strauss found no inclination to alimentary glycosuria in brandy-drinkers. Bessler² also noted that in a number of obese beer-drinkers glycosuria occurred. Barezczewski³ reports 2 cases of pentosuria, 1 physiologic, after the injection of a pound of plums, and 1 in a case of diabetes mellitus. Strauss,⁴ in another paper, further contributes to the study of alimentary glycosuria, especially to its relation with the nervous system. Glycosuria was noted in 36% of his cases of traumatic neuroses, and other functional neuroses in 10%. In acute lead-poisoning it was more marked than in the chronic form. He recommends caution in estimating the diagnostic importance of alimentary glycosuria. The quantity of sugar retained after its administration to rabbits is proportional to the dose injected. If injected into the hepatic vein the results are variable. Manganese lactate, antipyrin, and sodium bicarbonate decrease; while amyl nitrite, atropin, and pancreatic extract lower the proportion of elimination—i. e., the proportion between the quantity eliminated and the quantity absorbed (Gilbert and Carnot⁵). Conditions of general weakness, as anemia, etc., do not favor the appearance of alimentary glycosuria, and organic and functional diseases exercise a certain, but slight, influence upon it, provided that no acute exacerbations occur (Rosenberg⁶). The occurrence of glycosuria after the administration of 100 gm. of grape-sugar is pathologic.

Glycosuria Caused by Thyroid-gland Disease and by Feeding Thyroid Preparations.—Strauss⁷ has maintained that thyroidismus leads to only a very slight increase in the sugar of the urine. Bettmann,⁸ on the other hand, maintains that alimentary glycosuria is one of the most frequent symptoms in the picture of thyroidism. Von Marvin⁹ has attempted to solve the question by feeding both healthy and sick patients with large doses of thyroid tablets; 25 healthy persons received each 48 tablets, weighing 0.3 gm. apiece, in the course of 8 days. Two of these patients reacted and excreted sugar in the urine. A case of pneumonia also excreted sugar when the thyroid preparation was given 2 days after the crisis, while the result was entirely negative when the gland was administered on the sixth day after the crisis. In diseases in which alimentary glycosuria is frequently met with, as in Basedow's disease and in obesity, the administration of thyroid often fails to cause glycosuria. Von Marvin therefore concludes that glycosuria only rarely follows the administration of thyroid preparations, and inclines to the belief that in all of these cases an inherent disposition to glycosuria exists, and that but little is required to set up the condition. In opposition to Chvostek, Strauss found glycosuria in only 3 out of 18 cases of Basedow's disease.

Action of Drugs, etc., on Glycosuria.—Diuretin and caffein-derivatives may cause a glycosuria which is independent of the associated diuresis, but which really is a hepatic glycosuria, as the liver becomes incapable of serving as a reservoir for the stored-up glycogen. Richter¹⁰ used this method of producing glycosuria experimentally to see what agents caused a diminution in

¹ Naunyn, *Diabetes Mellitus*, p. 21, 1898.

² *Untersuch. über aliment. Glycosurie.*, Inaug. Diss., Erlangen, 1896.

³ *Gaz. Lekarska*, No. 15, 1897; from *Virchow-Hirsch, Jahreshb.*, Band i., S. 171, 1897.

⁴ *Deutsch. med. Woch.*, Hefte 18 and 20, 1897.

⁵ *Compt. rend. de la Soc. de Biol.*, 10 r. v. 5, pp. 330, 332.

⁶ *Ueber d. Vork. d. aliment. Glycos.*, Inaug. Diss., Berlin, 1897.

⁷ *Centralbl. f. d. krankh. Harn. u. sex-organe*, Band viii., S. 603, 1897.

⁸ *Ibid.*, S. 735.

⁹ *Berlin. klin. Woch.*, Heft 52, 1897.

¹⁰ *Zeit. f. klin. Med.*, Band xxxv., S. 463; Band xxxvi., S. 152, 1898.

the amount of sugar eliminated. He finds that glycerin, which has long been used in the treatment of pathologic glycosurias, only very slightly influences the formation of sugar in the liver, and that opium possesses the power to preserve the glycogen and limits the formation of sugar in the liver; while antipyrin is only efficient if it has acted for a long time. Alkalies exert a certain amount of inhibitory action upon the production of sugar, and *Syzygium jambolanum*, which Graeser stated would diminish phlorizin-diabetes, is inactive. Glycosuria has been observed after the use of 15 gm. of sulphonal.¹

Carbon-monoxid and Glycosuria.—Glycosuria after carbon-monoxid poisoning has been studied by Straub.² It especially occurs in animals fed on meat. On a diet of carbohydrates—starch, grape-sugar, and milk-sugar—it failed to appear. He believes the sugar to be derived from the albumin of the food and body and from the gelatin of the food. Rosenstein³ corroborates Straub's conclusions, stating that the sugar may arise from the albumin of the body or food, and that the products of the pancreatic digestion of fibrin which are precipitated by alcohol have no effect on the sugar-formation, while after the administration of those products soluble in alcohol carbon-monoxid causes glycosuria; and Vamossy⁴ finds that neither leucin nor the bases nor the diamido combinations, which are precipitated from the pancreatic digestion of fibrin by phosphotungstic acid, can give sugar; and that it probably is due to substances belonging to the monoamido acids. Vamossy mentions that he proved the presence of sugar in the urine during asphyxia produced by hydrogen.

Phlorizin-glycosuria.—The diabetes⁵ caused by phlorizin lasts in rabbits from 7 to 20 hours, and does not depend so much upon the size of the dose of phlorizin as upon its repetition. It lasts longer when given per os than subcutaneously, owing to its slower absorption. The sugar-production is the same in herbivora and carnivora. Minkowski found in dogs whose pancreas was removed that the relation of dextrose to nitrogen was 28:1; and Lusk found practically the same result in his phlorizin-animals. On the first day after its administration the sugar-elimination is especially marked. Cremer and Ritter state that in phlorizin we have a good method of determining whether or not a substance taken is transformed into grape-sugar. Feeding various sugars to these animals shows that in phlorizin-diabetes the capacity to use up sugar is not lost; that if the diabetes is total, then apparently an excess of dextrose in the urine may arise from the glycogen formed by levulose, and that milk-sugar passes into dextrose. Gelatin is largely absorbed, and its decomposition in the body produces a slight increase in dextrose, but to a less extent than in the case of albumin. Phlorizin is a glucosid which on decomposition yields phloretin and sugar. This phloretin cannot synthetize with dextrose in the subcutaneous cellular tissues, but probably does so in the body proper. Intravenously used, it causes also a temporary glycosuria, and even will increase a phlorizin-glycosuria. After the administration of phlorizin the urine, even after fermentation, turns the plane of polarization to the left. This is probably due to unchanged phlorizin and its derivatives (Cremer⁶). Paderi⁷ claims that phlorizin-glycosuria is due to the action of phlorizin upon the central nervous system, especially upon the medulla—in fact, to a stimulation of the glycogenic center; that the increased sugar-elimination is due to an increase

¹ N. Y. Med. Rec., No. 10, 1897, from Naunyn, p. 36.

² Arch. f. exper. Path., Band xxxviii., S. 139, 1897.

³ Ibid., Band xl., S. 363, 1898.

⁴ Zeit. f. Biol., Band xxxvi., S. 82, 1898.

⁵ Ibid., Band xli., S. 272, 1898.

⁶ Ibid., S. 115.

⁷ Riforma Med., vol. iii., p. 308, 1897; from Arch. Ital. di Biol., vol. xxix., p. 245, 1898.

in sugar-production rather than to a diminution in its consumption, and that the sugar does not come from albuminoid metabolism.

Fehling's Solution.—Some care should be exercised in the use of Fehling's solution, as mineral acids, as well as sugar, phenylhydrazin, hydroxylamin, etc., reduce it (Jovitschitsch¹); and cane-sugar, which is present at times in the urine of diabetics, may render it difficult for the cuprous oxid to settle (Bretet²).

Methods for the Determination of Sugar.—Numerous methods have been proposed for the estimation and detection of sugar. Hoke³ and Froehlich⁴ precipitate the urine with the neutral and basic lead acetate and then heat the filtrate with a solution of methylene-blue, which is then reduced by the sugar; while the test is sensitive, it offers no advantages over the usual ones. Goff⁵ also uses methylene-blue, and claims that while normal urine may decolorize methylene-blue in alkaline solution, yet if normal urine is first diluted twice with water no reduction occurs. Carpené⁶ used barium hydroxid, which forms with sugar barium glucosate. This is then precipitated with alcohol. Bremer uses various anilin-dyes as a test for diabetic urine. To avoid the disturbing influence of kreatinin, uric acid, and glycuronic acid, as well as of drugs, Andres recommends that the urine be first treated with animal charcoal. Landolph⁷ recognizes in urine two kinds of sugars. One is ordinary sugar, which ferments quickly and completely at ordinary temperature. It is very constant, remaining several months unchanged. This is accompanied by another sugar turning the plane of polarization to the right. It resembles grape-sugar; but is unlike it in that its rotatory powers diminish on heating. The appearance of this sugar, which also ferments slowly, is to be considered a forerunner of true diabetes.

Alloxur-bodies.—There seems to be no direct relation between an abundance of Neusser's basophilic granulations and the amount of alloxur-bodies eliminated by the urine (Futcher⁸); and as the phosphoric oxid does not increase *pari passu* with the alloxur-bodies, Malfatti⁹ believes that the alloxur-bodies are not derived from the nuclein-decomposition, but that they may be a secretion from the leukocytes and cell-nuclei. Schmidt¹⁰ claims that the alloxur-bodies are end-products of albuminous metabolism; that they are derived from the albumin of the food or of the organs; and that they may be increased when there is an increase of those cells whose metabolic products consist largely of alloxur-bodies, as in leukemia, etc., and in toxic conditions producing alloxur-dissociation, as in uratic diathesis, etc. In gout Lagner¹¹ finds, in opposition to Kolisch, nothing characteristic as to the alloxur-bodies. In experimental lead-poisoning in dogs there is no retention of uric acid; and in one with nephritis the alloxur-bodies consisted mainly of xanthin-bases. Milk-diet caused no change. Hunger does not essentially change the alloxur-elimination (Luethje¹²). There has been considerable doubt¹³ as to the accuracy of the Krueger-Wulff method of estimating the amount of alloxur-bodies in

¹ Berlin. d. deutsch. Chem. Gesellsch., Band xxx., S. 2431, 1898.

² Chem. Centralbl., Band i., S. 67, 1898.

³ Prag. med. Woch., S. 441, 1898.

⁴ Centralbl. f. innere Med., S. 89, 1898.

⁵ Rep. de Pharm., pp. 250, 706, 1897; from Münch. med. Woch., S. 785, 1898.

⁶ Giorn. di Farm., from Münch. med. Woch., S. 785, 1898.

⁷ Jour. de Pharm. et de Chim., 1897.

⁸ Bull. Johns Hopkins Hosp., vol. viii., p. 85, 1898.

⁹ Centralbl. f. innere Med., S. 1., 1898.

¹⁰ Zeit. f. klin. Med., Band xxxiv., S. 263, 1898.

¹¹ Wien. med. Woch., S. 127, 1898.

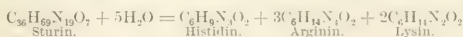
¹² Zeit. f. klin. Med., Band xxxi., S. 112, 1896.

¹³ Zeit. f. Biol., Band xxxv., S. 206; Centralbl. f. innere Med., 1897; Deutsch. med. Woch., Heft 23, 1897; Virchow-Hirsch, Jahresh., Band i., S. 161, 1897; Zeit. f. physiol. Chem., Band xxii., S. 556, 1897, and xxiii., 417, 1897.

the urine. Salkowski¹ finds that by this method other nitrogenous bodies are precipitated, so that it gives too high values; he believes it cannot be easily carried out with accuracy, and claims that Camerer's method is unsuitable. Malfatti, on the contrary, believes the method to be sufficiently accurate. Sundwik² claims to have obtained xanthin and hypoxanthin by the reduction of uric acid.

Heller's Test for Blood-coloring Matter in the Urine.—The red color which is obtained by boiling urine containing blood-pigment with caustic potash and then allowing it to cool, is not due to hematin, but to hemochromogen. Arnold³ considers the examination of this red color by the spectroscope as one of the most distinctive and simple tests for blood. He recommends the spectroscope because in some cases there may not be sufficient coloring-matter to color the phosphates with which it is precipitated; and urine containing melanin or urobilin, or after the administration of sena or chrysophanic acid, may give a red color with Heller's test. He claims that this combined method renders the recognition of blood-coloring matter possible where chemical examination alone would be uncertain.

Constitution of Proteids.—In a chemical investigation of cell-nuclei Kossel⁴ obtained from the spermatozoa of various fish 3 basic compounds which he calls protamins. One of these, salmin, was isolated from the salmon, and very closely resembles a substance which Miescher had previously obtained in an impure form. The analysis of its sulphate leads to the formula $C_{30}H_{57}N_{17}O_6$ for the base itself; a second protamin, sturin, from the sturgeon, has a composition which is closely represented by the formula $C_{36}H_{69}N_{19}O_7$; while the third member of the group, clupein, from the herring, is in all probability either identical or isomeric with salmin. All of these substances yield precipitates with potassium ferrocyanid and acetic acid, picric acid, and phosphotungstic acid, and are capable of forming insoluble compounds with benzoyl chlorid. When subjected to the action of trypsin⁵ they decompose easily, forming the 3 bases, histidin, arginin, and lysin; and a quantitative study of these products, formed by the action of boiling mineral acids, leads to the following equations as correct expressions of the reactions that occur:



The protamins, moreover, are laevorotatory and respond well to the biuret-reaction with sodium hydroxid and copper sulphate. The properties of the protamins which have been enumerated will be recognized as those common to the simple proteids. The following characters, which are wanting in the protamins, are more or less common, but none of them is possessed by all proteids: 1. Decomposition with pepsin. 2. Formation of aromatic substances and production of Millon's reaction. 3. Formation of monamido acids. 4. Adamkiewicz reaction. 5. Composition in sulphur. From these and other considerations Kossel assumes that in the molecule of every proteid there is a protamin-group which gives to the proteid its general characters; while the more special properties of proteids are possessed by virtue of the various groups with which the protamin-nucleus is conjugated. He therefore classifies the simple proteids as follows: 1. The protamins; these are the simplest

¹ Arch. f. d. ges. Physiol., Band lxi., S. 268, 1898.

² Zeit. f. physiol. Chem., Band xxvi., S. 131, 1898, and xxiii., 476, 1897.

³ Berlin. klin. Woch., S. 283, 1898.

⁴ Zeit. f. physiol. Chem., Band xxii., S. 176; xxv., 165.

⁵ Ibid., Band xxv., S. 190.

proteids. 2. Protamins paired with monamidoaliphatic acids, such as leucin, glyceol, aspartic acid, etc.; they also contain sulphur and occasionally other elements, as iodine. 3. Proteids which yield, in addition to the histon-bases, monamido acids and aromatic compounds. Most of the natural proteids are condensation-products from members of different groups. E. Bergh,¹ however, can find none of the histon-bases among the products formed by treating elastin with hydrochloric acid and stannous chlorid. This is not in accord with the work of Schwarz,² who found lysatinin in this connection; and as lysatinin has been shown by Hedin³ to be a mixture of lysin and arginin, these bases should have been found if Schwarz's work is correct. Hedin⁴ also made various unsuccessful attempts to obtain lysin among the decomposition-products of elastin, and calls attention to the fact that this proteid cannot contain a protamin-nucleus, since it does not yield histon-bases. Kossel⁵ finds, however, that if elastin is hydrolyzed with sulphuric acid, instead of hydrochloric acid, arginin can be proved among the products formed.

Conjugate Sulphates in the Bile of Fishes.—In the bile of the haifish (*Scymnus borealis*) Hammarsten⁶ shows the presence of at least 3 conjugate sulphuric acids. These compounds, which are called scymnolsulphuric acids, contain no nitrogen, but resemble the common bile-acids in giving the Pettenkofer test and the green fluorescence with concentrated sulphuric acid. Boiling acids form a substance closely resembling disysin; but alkalies split up the scymnolsulphuric acids into sulphuric acid and corresponding scymnols. One of the latter substances was obtained in comparative purity; but its analysis did not decide between the formulæ $C_{27}H_{46}O_5$ and $C_{32}H_{54}O_6$. Aside from the fact that the scymnolsulphuric acids have never been found in any other connection, the bile of the haifish presents an additional interest in that it contains no cholesterin. As one of the scymnols closely imitates several of the cholesterin-reactions, it is quite possible that the scymnols are derivatives of cholesterin.

Oxidation-products of Cholic Acid.—G. Bulnheim⁷ suggests improvements in the methods of obtaining large yields of the various oxidation-products of cholic acid. He finds also that cholic acid does not yield phthalic anhydrid when oxidized with potassium permanganate. This is in contradiction to the work of Senkowski,⁸ who claims to have found phthalic anhydrid in this connection, and who thus furnished a basis for the assumption that cholic acid contains a benzene-nucleus. Bulnheim found oxalic acid among the oxidation-products, and showed that this substance, when heated with resorcin, yields a product that forms a very markedly fluorescent solution in ammonia. He expresses his belief that Senkowski has mistaken oxalic acid for phthalic anhydrid.

Thyroidiodin.—Baumann's⁹ isolation of thyroidiodin, the physiologically active constituent of the thyroid gland, has been pronounced an epoch-making discovery. Whether this be true or not, if we are to judge by the number of investigations which this work caused, the discovery of thyroidiodin has certainly instituted what may be called a period of iodine-chemistry. Baumann's isolation of this substance may be briefly described as follows: The properly prepared glands are boiled with 10% sulphuric acid for 30 hours, and after removing the acid fluid the residue is again boiled from 6 to 8 hours, with

¹ Zeit. f. physiol. Chem., Band xxv., S. 337.

² Ibid., Band xxi., S. 297.

³ Ibid., S. 551.

⁴ Ibid., Band xxv., S. 296.

⁵ Zeit. f. physiol. Chem., Band xxi., S. 319.

⁶ Ibid., Band xviii., S. 487.

⁷ Ibid., Band xxv., S. 344.

⁸ Ibid., Band xxiv., S. 322.

⁹ Wien. Monats. f. Chem., 17, 1 ff. (1896).

renewal of the sulphuric acid. The product is extracted with boiling alcohol, and after evaporating the alcohol the residue is intimately mixed with milk-sugar and defatted with a mixture of ether and petroleic ether. The milk-sugar is then removed with hot water and the product purified by alternate solution in alkali and precipitation with acid. The organic substance thus obtained contains 9% of iodine. It also contains nitrogen and phosphorus, and was thought by Baumann to exist in the gland, in part free and in part in combination with proteids. According to Baumann's researches, thyroiodin gives more effective results in cases of myxedema and parenchymatous goiter than the administration of thyroid gland itself. These results have been sufficiently confirmed by F. Voit,¹ Roos,² and Magnus Levy.³ Baumann also thought that there is a connection between the content of the thyroid glands in iodine and the frequency of occurrence of goiter in certain regions, a conclusion which is based upon the rare occurrence of goiter in Hamburg, where the content of the thyroid gland is rich in iodine, and the frequency of occurrence of the disease in Freiburg, where the content of the thyroid gland is peculiarly poor in iodine.⁴ This conclusion, however, is not supported by the work of Oswald⁵ in Switzerland. Oswald found that the iodine-content of the thyroid was greater in some regions where goiter was common than in other regions where it was unknown. In regard to the influence of thyroiodin upon animal metabolism, there is practical unanimity of opinion that the general metabolism of the body, both in regard to proteids and fats is increased.⁶ Baumann believed that the activity of thyroiodin in thyroid therapeutics is not due to its iodine alone, but to the entire specific substance containing iodine. This assumption is well supported by the work of E. Roos,⁷ who finds that an iodized product obtained by introducing iodine into thyroiodin is a less efficient agent than thyroiodin itself, and that it exerts partially no influence upon animal metabolism, although the iodized product contains in some instances as high as 10.5% of iodine. Roos⁸ has also prepared 3 different specimens of thyroiodin, one from the thyroid gland of the wether, the others from human glands from Kiel and Switzerland respectively. Their analysis is given in the subjoined table:

	Thyroiodin from the wether.	Thyroiodin from human glands—Switzerland.	Thyroiodin from human glands—Kiel.
Iodine	4.31	1.31	2.58
Sulphur	1.40	1.40	1.40
Nitrogen	8.91	10.41	10.03
Carbon	58.24	6.141	57.04
Hydrogen	7.43	8.06	7.28
Chlorine	0.40	0.52	0.50

The author found chlorine in every specimen of thyroiodin analyzed, although he took every precaution against introducing this element in his reagents. He also regards the great differences in composition of these 3 specimens as no more remarkable than the differences which exist in the composition of hemoglobins from different sources.

Iodospongine.—Harnack⁹ has isolated from the common bath-sponge a substance called iodospongine, which contains iodine and possesses proteid properties. His method of isolation is essentially that given above for thyroiodin. Its final purification, however, is effected by dissolving the substance in

¹ Zeit. f. Biol., Band xxxv., S. 116.

² Deutsch. med. Woch., Heft 31, 1896.

³ Ibid., Band xxiii., S. 265.

⁴ Zeit. f. physiol. Chem., Band xxv., S. 242.

⁵ Ibid., Band xxiv., S. 412.

⁶ Zeit. f. physiol. Chem., Band xxii., S. 16.

⁷ Zeit. f. physiol. Chem., Band xxii., S. 1.

⁸ Zeit. f. Biol., Band xxxv., S. 116.

⁹ Ibid., S. 1.

ammonia and salting it out of this solution by saturating with ammonium sulphate. When freshly prepared the substance is of a light color, but soon darkens on exposure to the air. It blackens when boiled with an alkaline solution of a lead salt, and contains a remarkably high percentage of sulphur (4.54).

Iodofats.—The experiments of Winternitz¹ on the behavior of iodine-fat in the organism can be but briefly referred to in the space allowed. By treating various fats with iodine monochloride the author obtains fats which contain equivalent quantities of iodine and chlorine. After feeding these iodine-fats to various animals iodine was obtained from the tried-out fat, and also from the ether-extract of the bones, bile, brain, and muscle; and the urine in certain instances was found to contain iodine 10 days after feeding with iodine-fat had been discontinued. This iodine was found to be mostly in the form of alkaline iodide, but partly in organic combination.

The Assimilation of Iron.—Emil Häusermann² proves by experiments on animals that iron is most extensively absorbed into the system when it is furnished in natural foods. It is of great importance, therefore, to know the iron-content of the various animal and vegetable food-products, and the author gives a valuable table in which the previous analyses of G. Bunge³ and others are supplemented by his own. The seeds of various cereals when freed from their outer coats (the so-called bran) constitute the food which is poorest in iron, containing less of this element than does milk. Meat, fruits, and vegetables should constitute a large part of the food of the anemic. Gaule⁴ attempts to prove that when inorganic iron is administered to animals it can be detected in the form of organic iron compounds in the thoracic duct. He has also shown, by quantitative estimations before and after treatment, that inorganic salts of iron can increase the hemoglobin-content of animals.⁵

Häusermann noted that in Gaule's experiments the doses of iron were much larger than could be used for man without causing disturbances of the digestive tract, and concludes that after supplying an anemic person with proper food there is no necessity for the administration of iron salts. Bunge⁶ reports the results of some feeding-experiments upon young rats, in which some of the animals were fed upon meal-bread and others upon bran-bread. The much greater hemoglobin-content of the latter animals certainly leaves no doubt that rats at least can absorb sufficient iron, if it is administered to them in the proper organic form.

Papainproteolysis.—By a study of the action of papain, the proteolytic enzyme of the pawpaw plant, Chittenden, Mendel, and McDermott⁷ find that the enzyme is capable under certain conditions of converting relatively large quantities of various proteids into true peptones. Quantitative experiments show that the amount of peptone formed may be in excess of all other products combined, and that the principal soluble product of papain-proteolysis other than peptone is deuteroproteose. Experiments upon animals show that both the proteose and the peptone possess a marked ability to retard coagulation of the blood, and that the proteids share the property of lowering blood-pressure with the corresponding substances formed by animal enzymes.

The Products of Gastric Digestion.—Antipeptone Mixture.—A recent study of the histon-bases, arginin, lysin, and histidin, has shown that if these substances are formed at all in pancreatic digestion of proteids, we may expect to find them with Kühne's antipeptone. It is undoubtedly true

¹ Zeit. f. physiol. Chem., Band xxiv., S. 425.

² Ibid., Band xxiii., S. 555.

³ Ibid., Band xvi., S. 174.

⁴ Deutsch. med. Woch., Hefte 19-28, 1896.

⁵ Zeit. f. Biol., Band xxxv., S. 377.

⁶ Zeit. f. physiol. Chem., Band xxv., S. 36.

⁷ Am. Jour. Physiol., vol. i., p. 255.

that lysin¹ is formed by the pancreatic digestion of proteids; and as arginin² and histidin³ are almost constant companions of lysin, it is not impossible that antipeptone contains all three of these substances. Moreover, the existence of antipeptone does not lend support to Kossel's recently proposed protamin-theory of proteid constitution, and for this reason a study of the action of trypsin on blood-fibrin was undertaken by Kutscher,⁴ whose results lead unavoidably to the following conclusions: 1. By trypsin-digestion of fibrin, in the presence of lysin there are also formed considerable quantities of histidin and arginin. 2. The method of Kühne for obtaining crude fibrin antipeptone yields a mixture of substances, among which the hexon-bases are present in considerable quantity, a still greater yield of these bases being obtained when one attempts to purify antipeptone by means of phosphotungstic acid. 3. These bases must be found in the antipeptone portion of pancreatic digestion. If these conclusions are justified by facts it seems curious that Siegfried's sarcic acid should have been proved identical with antipeptone, which is itself a mixture.

Deuteroalbumose, the End-product of Gastric Digestion.—

Folin⁵ goes so far as to question the existence of any such substances as peptones. He separated a dialyzed solution of Witte's peptone by precipitation first with copper acetate, and salting out the filtrate by complete saturation with ammonium sulphate. By further manipulating the copper precipitate he obtains a proteid which responds to most of the tests for the protalbumoses; but, unlike these substances, it gives no clouding with nitric acid. With tannic-acid mixture the proteid forms a precipitate which dissolves in excess of the reagent, a property which has hitherto been thought characteristic of true peptones. By purification of the substance salted out with ammonium sulphate a proteid was obtained which, toward acetic acid and potassium ferrocyanid, tannic-acid mixture, and other reagents, behaves like a true peptone. The substance, moreover, contains scarcely a trace of sulphur, and when subjected to the further action of pepsin yields no other proteid. The specific rotation of a solution of this deuteroalbumose with an active pepsin preparation was found to be constant for a week, and at the end of this time nothing but the original deuteroalbumose could be found in the solution. The author concludes that this substance is a true peptone and an end-product of gastric digestion, and that Siegfried's sarcic acid is in reality an albumose.

Urine, Uric Acid in; Cook's Method.⁶—In a 15 c.c. graduated tube place 10 c.c. of urine, $\frac{1}{2}$ –1 gm. of sodium carbonate, and 1–2 c.c. of ammonia, and shake until the sodium carbonate is dissolved. Separate the earthy phosphates by centrifugation, and to the clear phosphate-free urine add 2 c.c. of ammonia and 2 c.c. of ammoniac silver-nitrate solution, and separate the translucent slimy precipitate also with the centrifugal machine. Mix the precipitate with 5 c.c. of ammonia and centrifugate until the lowest reading is to be had. Each c.c. on the graduated tube indicates .001176 gm. of uric acid in 10 c.c. of urine.

Hartley's Method.—The author⁷ claims that the following process can be executed in half an hour: To 50–100 c.c. of clear albumin-free urine add 5 c.c. of magnesia mixture, and to prevent precipitation of the xanthin-bases warm the solution upon a water-bath. Titrate the hot fluid with $\frac{1}{10}$ normal silver-nitrate solution until a drop of the fluid shows with ammonium sulphid

¹ Zeit. f. Biol., Band xxviii., S. 571; xxix., 320.

² Zeit. f. physiol. Chem., Band xxi., S. 155; xxii., 191.

³ Ibid., Band xxii., S. 176.

⁴ Ibid., Band xxv., S. 195.

⁵ Zeit. f. physiol. Chem., Band xxv., S. 152.

⁶ Med. Rec., p. 373, 1898.

⁷ Jour. Am. Chem. Soc., p. 649, 1897.

that the silver is just in excess. Each c.c. of silver solution added corresponds to .00336 gm. of uric acid. In case an estimation of xanthin-bases is required, the titration with silver nitrate should also be made in the cold, and the excess of silver solution required over that which is used for titrating a hot solution corresponds to the xanthin-bases. One c.c. of the silver solution corresponds to .000158 gm. of xanthin.

Modification of Hopkins's Method.—Folin¹ proposes the following modification of the well-known Hopkins's method. To each 100 c.c. of the urine analyzed 10 gm. of ammonium sulphate are added, and after 2 hours' standing the urate-precipitate is filtered and washed with 10% ammonium-sulphate solution; the urate-precipitate dissolved in sulphuric acid is titrated with standard potassium permanganate, and a correction of 1 mgm. is added to the final result. This alteration of the method is absolutely necessary, since it is claimed by the author that the precipitation of the urates with ammonium chlorid is not complete.

New Volumetric Method of Estimating Uric Acid in Urine.—F. W. Tunnicliffe and O. Rosenheim² have shown that piperidin and uric acid combine in molecular proportions, and that the resulting salt is soluble in water. A $\frac{1}{20}$ normal piperidin solution was found most suitable for titrating the urine, and this solution is standardized by estimating the amount which is required to neutralize a certain amount of $\frac{1}{20}$ normal acid solution. A few drops of an alcoholic solution of phenolphthalein are used as an indicator. In the experiments described with uric-acid solutions the titration was made with the liquid at the boiling-point. A table is given, showing the results obtained by titrating 100 c.c. of a number of urines by the new method as compared with the method of weighing the uric acid obtained from the same urines by Hopkins's method. The average difference between the two methods amounts to $\frac{2}{10}$ mgm. for 100 c.c. of urine. It is to be presumed that the weighing-estimations turn out higher, because in this case urinary pigments are thrown down with the uric acid, while in the case of the titration they remain unattacked by the piperidin solution.

Oxyproteinic acid, a Hitherto-unknown Constituent of Normal Urine.—R. Gottlieb and St. Boudzynski have described an oxidation-product of proteid origin which is found in the urine of the dog and also in that of human beings, and which probably plays a rôle of considerable importance in pathologic processes. Calculated as a barium salt, it is supposed to be excreted in amounts varying from 3 to 4 gm. in 24 hours, and 2–3% of the total nitrogen is to be referred to this acid for its source. As to its properties, it may be stated that it does not give the xanthoproteic reaction, and that it does not contain loosely combined sulphur, inasmuch as boiling with alkaline lead solution gives no brown discoloration. Millon's reagent gives only a slightly yellowish color, and decomposition with sulphuric acid shows that its molecule gives no tyrosin. In these respects oxyproteinic acid agrees with Maly's peroxypoteic acid obtained by oxidizing proteids with potassium permanganate. Unlike Maly's acid, however, it does not give the biuret-reaction, and is not precipitated by phosphotungstic acid or mercuric chlorid. Both mercuric nitrate and mercuric sulphate, however, precipitate it. For purposes of analysis the barium salt was prepared, and was found to correspond to the formula $C_{43}H_{74}N_{14}O_{31}Ba_4S$. The free acid is most probably represented by the formula $C_{43}H_{82}N_{14}O_{31}S$.

Uroproteic Acid, a New Constituent of the Urine.—Max Cloetta,³

¹ Zeit. f. physiol. Chem., Band xxiv., S. 224.

² Brit. Med. Jour., Feb. 5, 1898.

³ Arch. f. exper. Path. u. Pharmacol., Band xl., S. 29.

working under Schmiedeberg's direction, has isolated a nitrogen-and-sulphur-containing acid from the urine of dogs fed on meat, whose elementary composition is expressed by the formula $C_{66}H_{116}N_{20}SO_{34} + nH_2O$. The new acid is precipitated as a dough-like mass from urine when much alcohol is added; it is easily soluble in water and in alkalies, and is precipitated from its solution in weak alkalies by cupric acetate. It was purified in the form of its barium salt, which is insoluble in alcohol. Boiling the acid with dilute sulphuric acid causes it to decompose, with the formation of carbon dioxide, formic acid, ammonia, and a dark-brown substance, whose properties, appearance, and elementary composition enabled Cloetta to class it with the melanins. This uromelanin is the result of a complicated reaction, a small amount only being obtained when uroproteic acid is treated as described. The new substance is undoubtedly a derivative of the proteids, and possibly owes its origin to the direct oxidation of serum-albumin. It fails to give the biuret-reaction, and in its behavior to mineral acids it shows a great similarity to glycuronic acid, which, under the same circumstances, also breaks up into carbon dioxide, formic acid, and humus-like substances.

Occurrence of a Nucleohiston in the Urine.—In pathologic conditions which involve the formation of pus (cystitis, pyelitis, pyelonephritis, etc.) Jolles¹ finds constantly in the urine a porteid which, from its chemical reactions, must be regarded as a nucleohiston. The substance contains phosphorus, and when treated with hydrochloric acid gives rise to a hydrolytic product, which is free from phosphorus and shows itself in all respects identical with the histon which Kossel² obtained indirectly from red blood-corpuscles. The following simple process will serve to show the presence of the nucleohiston in a suspected urine: 50–100 c.c. of proteid-free urine are faintly acidified with acetic acid (4%), and with continual agitation barium chlorid (10%) is added until a further addition of the reagent causes no increase in the cloudiness. After the precipitate has subsided the liquid is filtered off and, without washing, the filter with the precipitate is allowed to stand in contact with 1% hydrochloric acid for 3 to 4 hours. The liquid is now made very faintly alkaline with sodium carbonate and the barium carbonate filtered off. With part of this solution a biuret-test is made. A second portion is faintly acidified with hydrochloric acid and then treated with ammonia. A marked clouding of the liquid will occur in case the histon is present. In the case of urines which contain albumin the common method of precipitating with sodium acetate and iron chlorid is inadmissible, since the nucleohiston itself is thrown down under these conditions. In such a case proceed as follows: To the urine add a little infusorial earth and precipitate the nucleohiston with acetic acid. Effect hydrolysis with hydrochloric acid and precipitate the histon from the acid solution with ammonia. Dissolve the precipitate in acetic acid and test for the proteid by the biuret-reaction and by coagulation on heating.

Urine, Bile-pigments in.—Adolf Jolles³ claims that the methods hitherto proposed for the detection of bile-pigments have not the sensitiveness that has been claimed for them, and recommends the following simple method: 30–50 c.c. of urine are shaken in a separating-funnel with 3–5 c.c. of 10% barium chlorid and 5 c.c. of chloroform. After the fluids have separated the chloroform and the precipitate are run into a porcelain dish and the chloroform evaporated by gentle heat upon a water-bath. In case bile-pigments are present, the residue will yield the characteristic Gmelin reaction with concentrated

¹ Zeit. f. physiol. Chem., Band xxv., S. 236.

² Ibid., Band viii., S. 511 and 515.

³ Zeit. f. anal. Chem., Band viii., S. 99; Wien. med. Woch., Heft 52, 1897; Ibid., S. 173, 1898.

⁴ Wien. med. Woch., S. 784, 1898.

nitric acid to which one-third of its volume of fuming nitric acid has been added.

Urine, Indican in.—The following method for the quantitative determination of indican is proposed by Richardson and Whitney:¹ To 500 c.c. of filtered albumin-free urine an excess of hydrochloric acid and ferric chlorid is added, the material boiled for 1 hour, and after filtering and washing, the nitrogen in the precipitate is estimated by the Kjeldahl method. If it is desired to estimate the indirubin separately the precipitate should be washed with 97% alcohol and the nitrogen in the alcoholic solution estimated as before. The amount of nitrogen multiplied by 17.9285 will give the amount of potassium indoxyl sulphate. E. Wang² precipitates the urine with a 20% solution of lead acetate, and mixes the clear filtrate with an equal volume of Obermayer's reagent; the mixture is shaken with chloroform, the chloroform evaporated, and the residue taken up in 3–4 c.c. of concentrated sulphuric acid; after standing 24 hours the acid solution is poured into 100 c.c. of cold water and titrated with standard potassium-permanganate solution. The amount of indigo is obtained by multiplying the oxalic-acid value of the permanganate solution used by 1.04.

Cystinuria and Cystin Calculi.—J. B. Ogden reports on the chemical examination of the urine and of a cystin calculus removed from a patient with chronic cystitis, the disease having been caused by the deposition of cystin in the form of a stone, whose thin outer coat consisted mainly of ammoniomagnesium phosphate, a trace of calcium salts, and a small amount of cystin. From the crushed stone cystin was isolated in the form of hexagonal crystals. The author points out that the evolution of hydrogen sulphid from the urine should always lead to its examination for cystin, although, as he says, hydrogen sulphid is not always due to the presence of this substance. "A person who has once had a cystin calculus is very likely to have another, the liability perhaps being greater than when it is formed of other crystalline elements, since, so far as I have been able to learn, no satisfactory treatment has yet been instituted for the relief of cystinuria."

Acetone.—The conditions of formation of acetone in the animal organism have been very thoroughly investigated by Geelmuyden.³ By estimations of the quantity of this substance in the urine and expired air, after the administration of varying quantities of the substance, the author concludes that the appearance of acetone in the excretions is not due to cessation of the normal function of destroying acetone, but to the overproduction of this substance by the body. He finds, also, that acetonuria appears if a sufficient quantity of carbohydrate food does not undergo metabolism, and that existing acetonuria can be suspended by its administration. In cases of acetonuria under absolute starvation, or with a diet from which carbohydrates are absent, the production of acetone is caused by the metabolism of fat. L. Schwarz⁴ reaches independently the same conclusions, and suggests a method for the determination of acetone in the presence of acetoacetic acid. By a series of experiments upon the production of acetonuria in normal and diabetic individuals, Hirschfeld⁵ shows that the conditions of formation of acetone in diabetes and in health are not different; and concludes that acetonuria in diabetes is without importance unless accompanied by the ingestion of 100 gm. of carbohydrate food.

¹ Jour. Am. Med. Assoc., Apr. 16, 1898.

² Zeit. f. physiol. Chem., Band xxv., S. 406.

³ Ibid., Band xxii., S. 526.

⁴ Arch. f. exper. Path. u. Pharmacol., Band xl., S. 168.

⁵ Zeit. f. klin. Med., Band xxxi., S. 212.

Blood: Hemochromogen.—By a rather ingenious device von Zeynek¹ has succeeded in obtaining hemochromogen, a substance which has hitherto been known principally by its spectroscopic characters. A solution of hematin in a slight excess of ammonia was reduced with hydrazin hydrate, the hemochromogen formed was washed with alcohol and then with ether, and finally dried to a constant weight. By means of a complicated piece of apparatus it was found possible to perform all of these operations in an atmosphere of hydrogen, and to obtain finally a brownish-red amorphous powder, which when thoroughly dried is fairly stable in the presence of air. The analysis of the substance leads to the assumption that it is formed by the abstraction of one atom of oxygen from two molecules of hematin. The author has also made an optical study of the substance, and suggests the photometric determination of hemochromogen as a basis of a more delicate method for determining iron in blood than any that has hitherto been proposed. Such a method would have the additional advantage that its results would be uninfluenced by the presence of iron not originally present as hemoglobin.

Comparative Quantitative Analysis of Blood.—Abderhalden² makes a valuable contribution to the comparative quantitative analysis of the blood. The work consists of an almost endless series of quantitative determinations. The serum and corpuscles of a large number of animals are examined independently for various organic and inorganic constituents. Aside from the value of so complete a series of quantitative analyses for reference, the author is able to deduce the following conclusions: The composition of the serum is fairly uniform for all animals. The corpuscles of all the animals examined are found free from sugar, fat, and chlorin. The corpuscles of the carnivora and ruminants contain sodium; while this element is lacking in the corpuscles of the horse, pig, and rabbit. With the exception of the sheep, the smaller animals have a greater percentage of hemoglobin in the corpuscles.

The Globin of Hemoglobin.—The chemical identity of the so-called globins which are conjugated with hematin in the various hemoglobins is a matter of the utmost importance. This is true not only because hemoglobin exists in the blood in greater quantity than any other organic constituent, but because a new and striking proof of the genetic relation between the red and white blood-corpuscles would be established in case the globin could be shown identical with or nearly related to the proteid which occurs in large quantity in the leukocytes. The difficulty of splitting off the globin without at the same time altering its chemical nature has hitherto prevented chemists from obtaining conclusive evidence as to the chemical character of the proteid. N. Schulz,³ however, has lately shown that it is possible to effect a hydrolysis of hemoglobin and to obtain a product which shows no evidence of having suffered a deep-seated decomposition. A solution of pure recrystallized oxy-hemoglobin from horse-blood was treated in the cold with strongly diluted hydrochloric acid until the precipitate which is first formed has redissolved. On adding a small quantity of alcohol and shaking with ether a sharp separation of the hematin from the globin is effected, all the coloring-matter having passed into the ether, leaving a perfectly colorless aqueous solution of the proteid. A qualitative study of the proteid leads the author to the conclusion that the substance must be classed with the histons, and is therefore closely related to the compound which Lillienfeld isolated from the leukocytes of the lymph-glands. The marked difference in chemical composition which was

¹ Zeit. f. physiol. Chem., Band xxx., S. 492.

³ Ibid., Band xxiv., S. 449.

² Ibid., S. 65.

found to exist between the two substances is considered without significance, since the compounds were obtained from different animal species.

On the Blood in High Altitudes.—In order to explain the increase in the number of red corpuscles and the greater percentage of hemoglobin in the blood of animals that are confined to high altitudes, the following assumptions have been offered: 1. The blood is more concentrated. 2. There is an increased production of hemoglobin and red corpuscles. Weiss shows that the first explanation is correct by the following experiments: A number of animals were kept in high altitudes during a month, and by comparison of the number of blood-corpuscles obtained by count with that of animals which were kept on the lowlands, it was found that the corpuscular richness of the former was increased on an average of about 18%. Yet it was found that the total hemoglobin of the body was unchanged.

On Serum-albumin of Horses' Blood and its Primary Digestion-products.—E. S. Faust¹ has attempted the quantitative study of the primary digestion-products of serum-albumin of horses' blood prepared and purified according to the Gürber-Michel method. The digesting fluid was obtained from the pig's stomach, and was made with the precautions suggested by the researches of Nittich, Wurtz, Pick, and K. Mann. The neutralized and filtered gastric juice was poured onto the coagulated albumin to be digested, and was thoroughly mixed with it. The mixture was then put on a filter, allowed to drip off, and then washed with water until all the proteids of the gastric juice employed had been washed away. The pepsin attaches itself to the coagulated proteid, and cannot be separated from it by washing. The "pepsinized" albumin is then covered with from 2 to 3 volumes of 0.3% to 0.4% hydrochloric-acid solution warmed to 38°–40° C., and digested in a water-bath kept at the temperature stated. Solution takes place in a very short time, 20 minutes or less being required for the digestion of 30 gm. or more of dry albumin. Numerous combustion-analyses were made of the "neutralization"-product, or insoluble albumose, and of the soluble albumose, and Schmiedeberg's method of constructing the "ground"-formula of proteids is made use of in calculating the analytical results obtained. On adding the products of the digestion it was found that there was a deficiency in nitrogen. Experiments were undertaken to show that the nitrogen was not split off in the form of ammonia. The author concludes, therefore, that gastric digestion is not a simple hydrolysis, but a more complex process, in the early stages of which a neutral compound, rich in nitrogen and comparable perhaps to cyanamid, is split off.

Proteid Metabolism in Febrile States and during Abstinence from Food.—L. Krehl and M. Matthes² first pass judgment on the view of Unverricht, v. Noorden, May, Hirschfeld, and others in regard to the metabolism of fever, and then give the results of their own carefully conducted experiments. They find that albumosuria is of almost constant occurrence in both infectious and aseptic fevers, but is absent in the hyperthermia caused by injury to the thermic centers or by the application of excessive heat. In aseptic fevers the excretion of nitrogen is greatly increased and more proteid material is destroyed in the body. This increase in the output of nitrogen is also noticeable after the injection of a substance which is capable of raising the temperature of the body, even when no febrile reaction has occurred. Withdrawal of food during several days before the production of an experimental aseptic fever will either entirely prevent a rise of temperature or greatly lessen it. The authors regard it as highly probable that the symptoms of fever are

¹ Arch. f. exper. Path. u. Pharmacol., Band xli., S. 218.

² Ibid., Band xl., S. 436.

due to poisoning caused by substances which arise from proteids, which, in febrile states, break up in a manner different from the normal. The experiments from which the above deductions were drawn were made on various animals; on a student with pruritus, into whom albuminose was injected in order to cause fever; and on a patient with a hydrocele, in whom the fever was caused by the injection of iodin into the sac.

On the Relation of the Carbon to the Nitrogen in the Urine of Fever-patients.—It has been maintained by Loewy, but more especially by May, that in fever the amount of carbon in the urine is increased relatively more than the nitrogen. Scholz¹ has investigated this question on patients suffering from various kinds of fever, malaria, pneumonia, typhoid, angina tonsillaris, and on those made febrile by the injection of Koch's tuberculin. The patients were kept on a constant mixed diet; the nitrogen of the urine was determined by the Kjeldahl-Argutinski method, and the carbon by a method described by the author in an earlier paper. In some of the cases studied the increase in the carbon excreted was slightly greater, relatively, than that of the nitrogen; in another case the opposite was found to occur. The author concludes that these variations are no greater than those occurring in health.

Metabolism in Gout.—Schmoll² has investigated the metabolism of a patient with gout with especial reference to the nitrogen-changes. He found in an experiment continuing nearly 2 months a constant retention of nitrogen. The form in which the nitrogen was retained is uncertain. The administration of thyroid preparations for 4 days caused a decrease, but not a cessation, of the nitrogen-retention. The amount of uric acid excreted was about the same as that excreted by a person in health, on the same diet; after the administration of a thymus preparation there was an increase in the amount of uric acid excreted, just as in normal individuals. As there was no retention of uric acid, the view that gout results from the inability of the kidneys to excrete uric acid cannot be maintained. Contrary to the view of Kolisch, there was no increased excretion of the alloxuric bodies, and the relation of these to the uric acid was found to be the same as in health.

Effect of a Meal on the Nitrogen of the Urine.—It is usually stated that after a meal rich in proteids the urea in the urine gradually increases in amount up to a maximum and then gradually decreases. Veraguth³ finds that after such a meal there are 3 rises in the output of nitrogen in the urine; the first immediately after taking the food, a second rise 2 to 4 hours later, and the third 6 to 7 hours after the food. If the food contains a small amount of proteid the 3 rises are still visible, but are not so marked; the first one is the most constant, the others more variable.

Influence of Divisions of Feeding upon Metabolism.—Gebhardt⁴ has made a series of experiments to determine whether it is more advantageous for an animal to receive its food in one or in several meals a day. His results refer chiefly to the nitrogen-metabolism. He reached the conclusion that more nitrogen is retained by the body when the food is given in a number of meals, and that therefore this is the more advantageous method of feeding. He considers that when the food is given in a single meal much more proteid is broken down to amido acids, indol, etc., under the influence of bacterial putrefaction. Krummacher,⁵ working on the same problem, arrives at the same conclusions, as far as the retention of nitrogen under the two methods of feeding

¹ Arch. f. exper. Path. u. Pharmakol., Band xl., S. 326.

² Zeit. f. klin. Med., Band xxix., S. 510.

⁴ Pflüger's Arch., Band lxx., S. 611.

³ Jour. of Physiol., vol. xxi., p. 112.

⁵ Zeit. f. Biol., Band xxxv., S. 481.

is concerned. He considers, however, that the difference is not due to an increased breaking up of the proteids in the intestines when a large quantity is given at a single meal, for he finds that this does not occur. He explains the difference as follows: The rate of the breaking down of the proteids in the tissues depends upon the rate of absorption from the intestines; when the proteids are given in small amounts the rate of absorption from the intestines is less, and consequently that of the breaking down in the tissues is less and more nitrogen is retained in the body.

Proteid Metabolism and Excessive Muscular Exercise.—Dunlop, Paton, Stockman and Maccadam¹ report, in a joint article, the results of a number of experiments on the influence of muscular exercise, sweating, and massage on the metabolism of man, paying especial attention to the nitrogen of the urine. Some of the subjects of the experiments were in good condition of training; others were not. The exercise was obtained by bicycling, walking, digging, etc. The chief conclusions reached were: (1) That excessive muscular work causes an increased metabolism of proteids, as shown by the increased excretion of nitrogen and sulphur in the urine; this increase occurs largely during the days subsequent to the exercise. (2) That the proteid consumed is muscle-proteid. (3) That if the subject is in poor training the consumption of muscle-proteid is accompanied by the consumption of proteid of other tissues which contain nucleoproteids, as shown by the increased excretion of uric acid, nitrogenous extractives, and phosphorus. There may be a withdrawal of proteids from other structures to effect repairs in the muscles, the proteid portion being retained, while the nucleic-acid portion is excreted. By proper training such a transference of proteids is avoided. Sweating produced by a Turkish bath was not found to have any marked effect upon metabolism. Of especial interest is the fact that their experiments on the influence of massage on metabolism gave negative results.

Influence of Oxygen-pressure on Metabolism.—Terray² finds, from experiments on animals, that variations within wide limits in the amount of oxygen in the air respired has no effect upon the metabolism. When the air contains more than 10.5% or less than 87% of oxygen, the metabolism is normal. When the amount of oxygen is reduced to below 10.5% the respirations become deeper, and this compensates, at first, for the lower oxygen-pressure, and the metabolism is not affected; but when the oxygen is reduced to about 5% distinct changes in the metabolism occur; these are an increase in the carbonic acid excreted and a less marked increase in the nitrogen excreted, and the respiratory quotient becomes greater. As a rule, more nitrogen is excreted than is contained in the food, showing a considerable breaking up of the proteids of the body, although the amount of oxygen consumed is less than normal. Intermediate products of metabolism appear in the blood and urine. Lactic and oxalic acids occur in considerable quantities in the blood, the alkalinity of which is thus diminished and the excretion of carbonic acid facilitated. The urine of the rabbit, which is usually alkaline, acquires an acid reaction, due, the author thinks, to lactic acid. Albumin was always present in the urine; sugar was found but once. No distinct effect upon metabolism was observed when the percentage of oxygen in the air was increased to 87%; the oxidation was not increased, as has been supposed by some to be the case. The author holds that metabolism is a process regulated by the needs of the cells, and that it is but little influenced by external conditions.

Intestinal Reaction.—As a result of observations upon patients with intestinal fistule, the view that the contents of the small intestines are acid has

¹ Jour. of Physiol., vol. xxii., p. 68.

² Pflüger's Arch., Band lxx., S. 393.

been gaining ground. Moore and Rockwood¹ have investigated the question in animals, rabbits, guinea-pigs, white rats, cats, and dogs. In none of these animals do the contents of the small intestines show, normally, an acid reaction throughout, and the authors think it improbable that the latter is the case in man. Experiments were also made to determine the effect of various kinds of food upon the reaction of the intestinal contents. Fat was found to cause an acid reaction throughout the greater part of the intestine in the dog, but not in the guinea-pig. Carbohydrates greatly increase the alkalinity; proteids cause an acid reaction in the upper part of the intestine in the dog, while in the guinea-pig the intestinal contents remain alkaline throughout. The reaction of the contents of the alimentary canal and other problems connected with digestion have also been studied by Gillespie.² The experiments were made on dogs and one calf. The results differ from those of the above authors, inasmuch as Gillespie found the contents of the alimentary tract to be invariably acid. The acidity was due in the duodenum to hydrochloric acid and proteids, and also to organic acids, such as acetic and lactic. In the lower parts of the tract the acidity was due to organic acids and acid salts. Proteids and acids in the food caused an increase in the acidity in the stomach and duodenum; the administration of alkalis led to a decrease of the acidity in the stomach, but to an increase of it in other parts. Gillespie also determined the chlorin in different sections of the alimentary canal; he found it to decrease from the stomach down to the upper half of the ileum, and then to increase. The latter increase was due to inorganic chlorids. The organisms in the bowel are divisible into two great groups—acid-producing and alkali-producing; the former are unable to liquefy gelatin, while the latter are capable of doing so. The alkali-producers are the ordinary putrefactive organisms; they produce ammonia, which unites with the lactic acid produced by the acid-producers; the ammonium lactate thus formed is favorable to the development of both classes. Some antiseptics appear to act upon one class more powerfully than upon the other; salol, for example, acts more energetically upon the alkali-producing organisms, calomel upon the acid-producing. Trypsin was found to be capable of energetic action in the presence of organic acids; but fresh quantities must be constantly supplied, as the acids destroy it. The paper contains numerous other points of interest upon this subject.

Absorption of Fats.—Objections to the commonly accepted theory that fats are absorbed from the intestines in the form of an emulsion have been raised by various authors. A histologic examination has failed to show the passage of fat-globules through the striated border of the epithelial cells of the intestine; further, absorption of fats goes on when there is no emulsion, but only a clear solution in the intestine. Moore and Rockwood³ have made a series of experiments upon this subject, from which they conclude "that most, if not all, the fat is absorbed in soluble form by the epithelial cells, either as fatty acid or as soap; but that the proportion in either form varies with the animal." To the theory that the fat is absorbed as fatty acids, the objection has been made that these are as insoluble as the fats themselves; this objection the authors meet by a series of quantitative experiments showing the very considerable solubilities of the common fatty acids in the bile. In fact, they conclude that all the fats of an ordinary meal can be absorbed in the form of a solution of the fatty acids in the bile. To Munk's objections that the fats cannot be absorbed as soaps because (1) the intestinal contents are acid and (2) the amount of alkali in the intestinal secretions is much too small to convert all

¹ Jour. of Physiol., vol xxi., p. 373.

² Proc. Roy. Soc., vol. lxii., p. 4.

³ Jour. of Physiol., vol. xxi., p. 58.

the fats into soaps, they reply (1) that in the dog (upon which many of these experiments were made) the acid reaction of the intestinal contents is due to organic (fatty) acids, in the presence of which there is no reason why soaps should not exist; and (2) that the alkali may simply act as a carrier to convey the fat in the form of soaps to the intestinal cells; the latter may return the alkali to the intestine, while the fatty acids are combined to form neutral fats.

Transformation of Fat in the Blood.—While the passage of fat from the digestive tract into the lacteals and blood has been carefully studied, little attention has been paid to the passage of fat from the blood to the tissues. Bunge has suggested that the fine fat-droplets may pass through the capillary walls just as bacteria and some coloring-matters do; but the experiments of Röhrig, which showed no increase of fat in the cervical lymphatic duct after a meal rich in fat, are opposed to such a view. Cohnstein and Michaelis¹ showed that fat does not pass from the blood to the lymph-vessels, although the fat when injected into the blood-vessels soon disappears. They then made a series of experiments on the effect of mixing the lymph of the thoracic duct after a fatty meal with defibrinated blood. If a stream of air was passed through such a mixture the fat soon disappeared. Serum does not have this action upon fat, but laky blood does; hence they conclude that some element is contained in the red blood-corpuscles which transforms the fat or has a "lypolytic action" similar to the pancreas and some plant-seeds. The fat is not completely oxidized, for there is no carbonic acid produced. The authors suggest that perhaps the fats are converted into soaps. Harriot published a paper 2 years ago in which he stated that fats are saponified by blood-serum, his results differing in this respect from those described by Cohnstein and Michaelis. Harriot attributed this action to a fat-splitting ferment, which he called *sero-lipase*. In a second paper Harriot² gives further details of his experiments. He tested the action of serum on monobutyrin, the activity of the serum being determined by the amount of sodium carbonate neutralized by the butyric acid formed. He holds that this ferment is not derived from the pancreas, as the serum of animals from which this gland has been removed is active. Moreover, the ferment of the serum differs from that of the pancreas in acting energetically upon monobutyrin in an acid medium. Further, the activity of the blood-serum ferment is much increased when the temperature is raised to that of the body, while that of the pancreatic juice is not so affected. The above experiments were made with the serum of the horse; but that of the eel was even more energetic. Although the ferment is active in an acid medium, still its activity is greater in an alkaline medium, and increases as the alkalinity increases; hence the administration of alkalies is favorable to the transformation of fats both in the intestines and in the blood.

Kola.—J. W. T. Knox and A. B. Prescott³ have separated from kola-nuts a compound of caffein and tannin, called kola-tannin, which contains from 19% to 25% of caffein. The new compound is a cream-colored powder, soluble in water, alcohol, ethyl-acetate, and acetone; insoluble in chloroform, and only slightly soluble in ether.

Fèces, Determination of Undigested Fat and Casein in.—Herman Poole⁴ describes his methods of determining undigested fat and casein in the feces of infants. The ether-extract of the dried feces, containing fat, cholesterol, etc., is evaporated to dryness and then saponified with alcoholic potash. Water is then added, and the alcohol is expelled by evaporation until the mass

¹ Pfüger's Arch., Band lxx., S. 473.

² Compt. rend. de la Soc. de Biol., vol. cxxiv., p. 778.

³ Am. Chem. Jour., p. 43, 1898.

⁴ Ibid., vol. xx., p. 765.

is nearly dry. More water is added, and the solution is filtered and shaken out with ether in a separatory globe. The solution thus freed from cholesterol is evaporated nearly dry, dissolved in water, and the fat acid determined as usual by precipitation with mineral acid, collecting, and weighing. The solid residue from the original ether-extraction was treated successively with water and alcohol and then dried at 100° C. This dried residue was then digested in a mixture of equal parts of hydrochloric acid for some 10 or 12 hours, at a temperature of about 60° C. This dissolved in casein and decomposed the earthy fat-acid salts. No attention was paid to the fat-acid which always separated on cooling, as this was considered to have been digested or changed in the system, and only undigested fat was sought. After cooling the solution of casein and filtering it was evaporated to dryness, and the nitrogen determined by the Kjeldahl method. The results are given in tabular form. The quantity of fat, casein, and cholesterol varied considerably, even in the same individual, from day to day. A large amount of fat is generally accompanied by a large amount of casein.

The Mineral Constituents of Tubercle-bacilli.—E. H. de Schweinitz¹ and Marion Dorset find that when tubercle-bacilli are grown upon neutral beef-broth containing 1% of peptone, $\frac{1}{2}$ % of salt, and 7% of glycerol, their ash contains no sulphates, chlorids, or carbonates. The probability that the chlorids and sulphates were washed out of the germs in the process of preparing them for analysis is admitted. The presence of these salts in the culture-media would seem to be necessary for development of the germ, and it is possible, in the opinion of the authors, that they are present in the cell-contents of the germ rather than as a part of its structure. Phosphorus pentoxid is the only acid radical found in the ash, and it is present to the extent of 55.23% of the ash. The bases found are sodium, potassium, calcium, and magnesium. Compare Cramer's analysis of the ash of the cholera-germ.²

Taste of Acids and Dissociation.—T. W. Richards³ finds that it is possible easily to detect sourness in a millinormal solution of acid; and that in working with decinormal solutions of acids and alkalies we can determine the end-point by the sense of taste to within 1% or 2%. The sense of taste may therefore be used more precisely in the laboratory than is usually believed. Acids owe their taste to the hydrogen ion; an acid solution which is distinctly sour becomes absolutely tasteless upon neutralization. According to the dissociation-hypothesis, the hydrogen ions have been removed by the neutralization, and the experimenter is now tasting potassium and chlorin ions, which have no marked taste, or else have the property of nearly eliminating one another's taste by mixture. The author also studied the effect upon the taste by the addition of small amounts of salts, whose solutions are highly dissociated, to dilute solutions of the acids to be tasted, and find that the resulting diminution of the acid taste can be explained by the help of the dissociation-hypothesis and the law of mass-action.

The Action of Albumoses and Peptones in Intravascular Injections.—Edmond Figuet⁴ has carefully purified peptones and albumoses and injected them into dogs and rabbits, in amounts as high as 7.7 gm. per kilo of body-weight, without injurious effects. The coagulability of the blood was not altered. Figuet concludes that the poisonous effects usually ascribed to peptones and albumoses are in reality due to ptomaines or other toxins which have not been removed from them by the ordinary processes of purification.

On the Presence and Detection of Iodin in the Hair.—W.

¹ Am. Chem. Jour., vol. xx., p. 618, 1898.

² Arch. f. Hyg., Band xxviii., Heft 1.

³ Am. Chem. Jour., vol. xx., p. 121. ⁴ Compt. rend. de l'Acad. des Sci. Paris, 1897, p. 1371.

Howald¹ finds that there is no demonstrable amount of iodine or bromine in ordinary human hair, but that these elements appear rapidly in hair after the administration of salts of these halogens. The inorganic salt appears to deposit its halogen as an organic compound in the growing portion of the hair.

Action of Antiseptics, Coloring-matters, etc., on the Digestive Processes.—F. D. Simmons² has studied the retarding action of various poisons on gastric and intestinal digestion, using commercial pepsin or pancreatin, and estimating the amount of albumin or pancreatin left undissolved after the enzymes had been allowed to act for a certain time under the influence of the poison on trial. Picric acid, when present in as low a proportion as 0.06%, hindered peptic digestion, but was without action on pancreatic digestion. Bismark-brown, formalin, and essence of cinnamon acted in a reverse manner—that is, they hindered pancreatic digestion, but did not affect gastric digestion. Metanil-yellow and tropaeolin 000, salicylic acid, and oil of wintergreen all behaved like picric acid. Essence of peppermint, chrysoidin, safranin, and methylene-blue exerted no influence on the action of either ferment. C. F. Mabery and Leo Goldschmid³ have studied the action of alum, boric acid, salicylic acid, and formalin on peptic digestion. A very small amount of alum (0.1%) is shown to cause a decided retardation. The influence of this substance is well illustrated in the experiments showing that bread prepared from an alum baking-powder is less rapidly digested than bread made with a cream-of-tartar powder. Salicylic acid behaves in a similar manner, though it is much less powerful in its action. Boric acid had a comparatively slight action when present in proportions varying from 0.05% to 0.03%; while formalin produced a marked effect. Kiouka⁴ has carefully investigated the physiologic action of sulphurous acid and of sodium sulphite, for the reason that these substances are widely employed as food-preservatives. Small doses of sodium sulphite are shown to paralyze the heart and the central nervous system of frogs.

Influence of Boric Acid on the Action of the Digestive Ferments and on Nutrition.—R. A. Cripps⁵ confirms earlier investigators in showing that boric acid has practically no effect on the action of the salivary, pancreatic, gastric, or milk-curdling ferment, even when employed in concentrations as high as 1%. R. H. Chittenden and W. J. Gier⁶ have studied the influence of borax and boric acid on nutrition, with special reference to proteid metabolism. The experiments of these investigators were conducted upon full-grown dogs, and extended over periods ranging from 27 to 56 days. It was found that moderate doses of borax up to 5 gm. a day are without influence on proteid metabolism, and do not appear to exert any specific influence upon the general nutritional changes of the body. Large doses of borax, 5–10 gm. daily, lead to an increased excretion of nitrogen, of sulphuric and phosphoric acids. Boric acid, in doses of 3 gm. per day, is also without influence upon the general nutrition of the body. Very large doses of borax retard the assimilation of proteid and fatty foods, and set up a tendency to diarrhea and an increased excretion of mucus. Neither borax nor boric acid shows any diuretic action, though both are quickly eliminated through the urine, 24 to 36 hours being generally sufficient for their complete removal. There was never any indication throughout the experiments of abnormality in the urine; albumin and sugar were never present. Neither agent has any influence upon the putrefactive processes of the intestine. When given in quantities equal to 1.5–2% of the daily food they are liable to produce nausea and vomiting.

¹ Zeit. f. physiol. Chem., Band xxiii., S. 209.

² Ibid.

³ Analyst, p. 183, 1897.

⁴ Am. Chem. Jour., 1897.

⁵ Zeit. f. Hyg., Band xxviii., S. 351.

⁶ Am. Jour. of Physiol., vol. i., p. 1.

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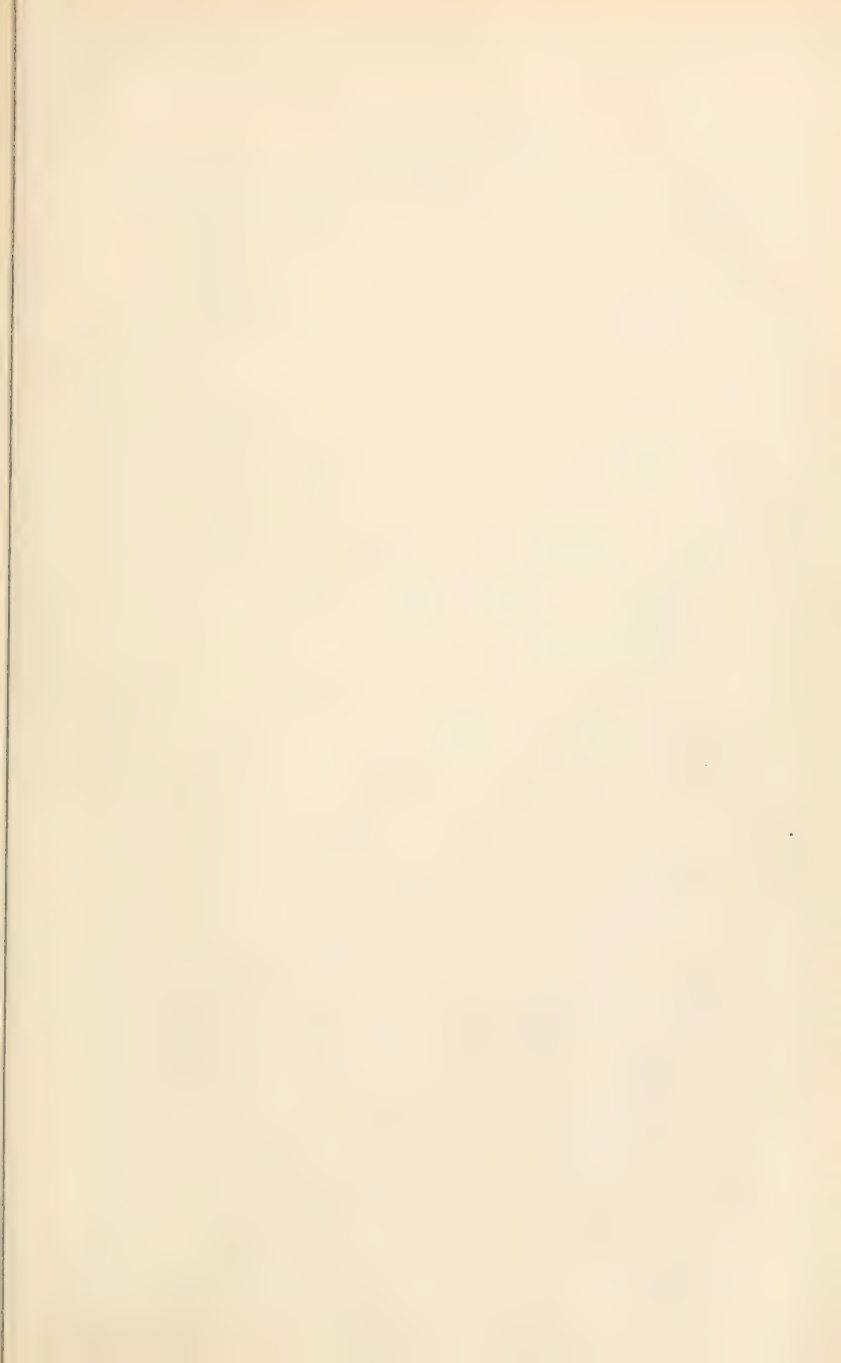
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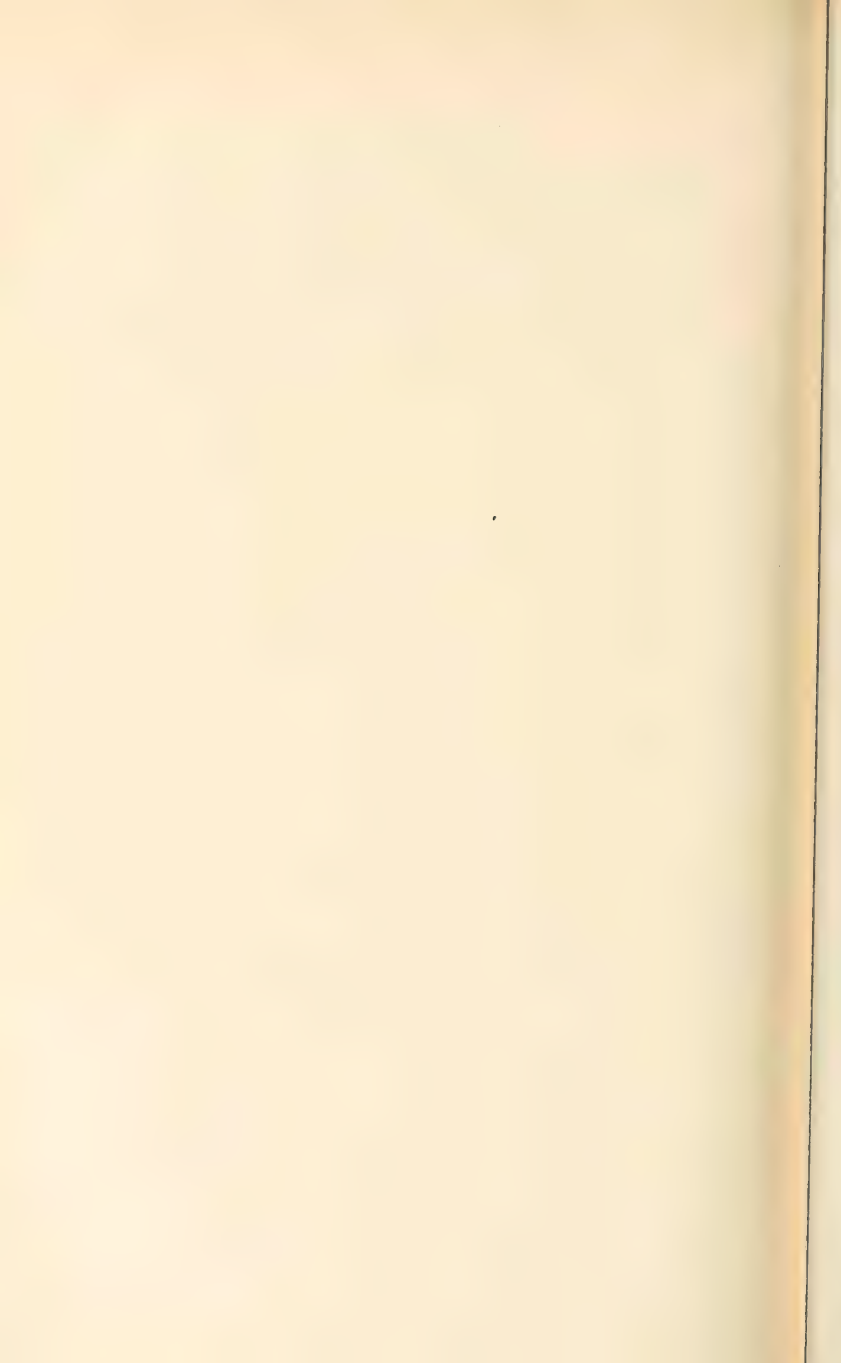
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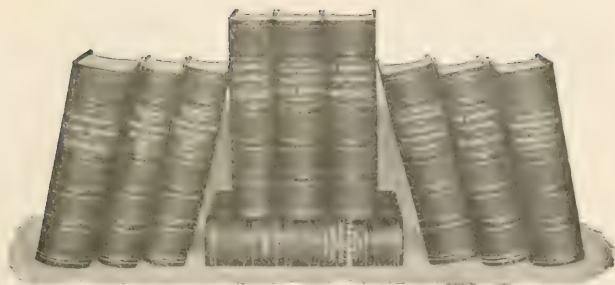
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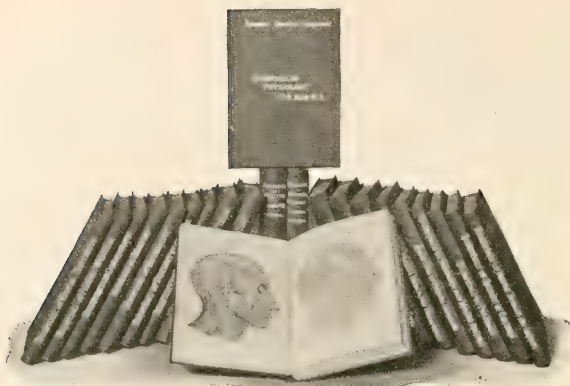
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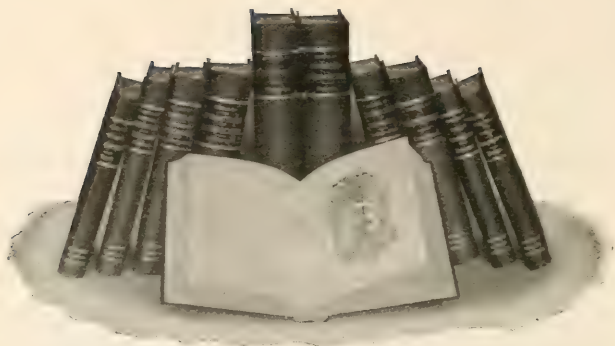
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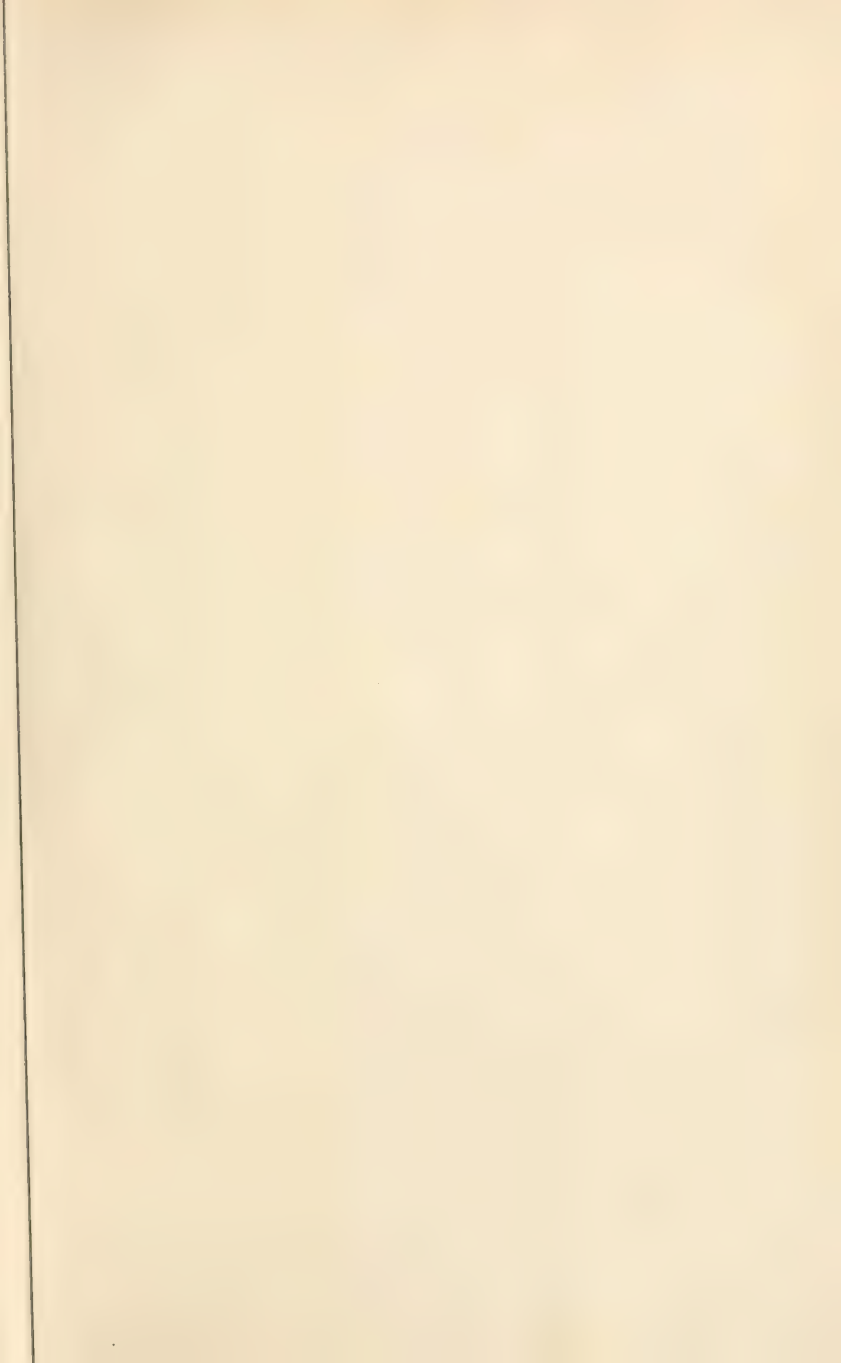
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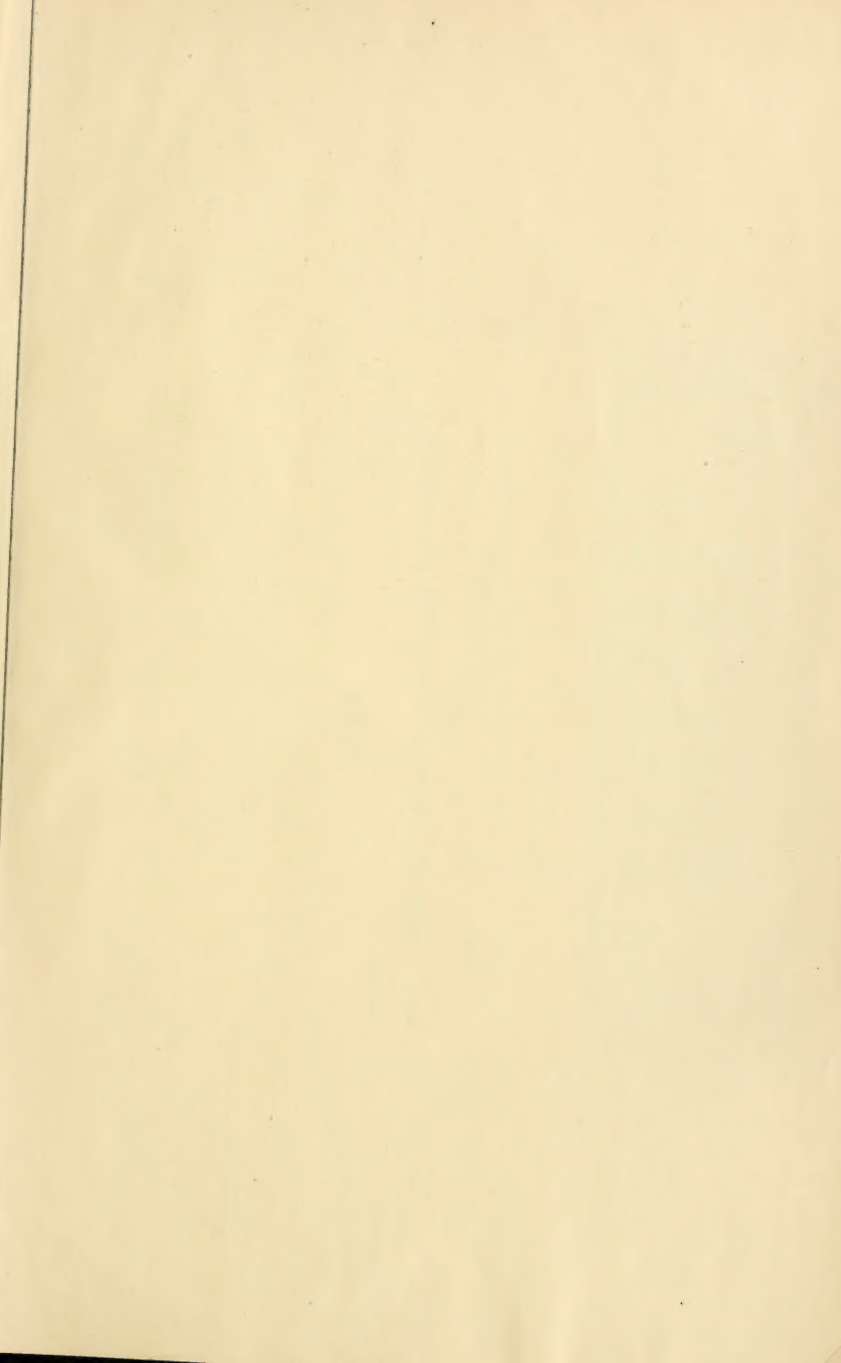
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